NATUR CYMRU
Nature of Wales

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- Seaweeds
- Sand dunes
- Ramsey Island
- Stackpole
- Hen Iwybrau
- Gwent orchards
- A Living Wales?
- Books, News, Comment...

Natur Cymru Ltd.
Maes y Ffynnon, Penrhosgarnedd,
Bangor, Gwynedd LL57 2DW, UK.

01248 387373
info@naturcymru.org.uk

Golygydd/ Editor:
James Robertson
naturcymru@gmail.com

Rheolwr Cynhyrchu /
Production Manager:
Mandy Marsh

Rheolwr Marchnata /
Marketing Manager:
Huw Jenkins
01766 590272
huw.naturcymru@btinternet.com

Tanysgrifiadau / Subscriptions:
Gweler y tudalennau canol i gael manylion llawn /
See centre pages for full details.

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Nature of Wales

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Cyswllt / Contact: Mo Morgan, Swyddfa NATUR Office, PO Box 62, Llandeilo, SA19 0AH.
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NATUR CYMRU EDITORIAL GOLYGYDDOL

Most articles fall into a least one of three broad categories: they provide detailed information about particular groups of plants or animals, locations or habitats; they describe the work that is going on throughout Wales in defence of nature; and they raise environmental issues of importance, to encourage debate. In brief, they are reminders of what we have got, what we are doing, what needs to be done.

Entries into our 'Inspired by Nature' writing competition have had elements of all these, but perhaps belong to a fourth category, which is about relationships, mainly between author and nature, and about entertaining writing. Three articles belong to this: a previous competition runner-up, and two prize winning entries from this year's competition. I hope you enjoy reading about toads, elephant hawk moths and feeding birds as much as I did.

As a journal of record, it is important that we carry authoritative, up-to-date articles about aspects of the natural environment. A whistle-stop tour of the seaweeds around our coast offers a really good introduction to an important and often neglected group of plants. It is a subject to which we will return. The account of grassland fungi at Stackpole includes, among the array of colourful waxcaps and curiously shaped earthtongues, a pinkgill new to Britain.

Stories about conservation achievement, small examples of turning the tide for nature, have figured prominently in our pages. They show what is possible, remind us that there are many conservation heroes out there doing great things, and that much has been achieved. Twenty years managing Ynys Dewi/Ramsey Island for nature, and the wider legacy of fifty years of National Nature Reserves, offer a couple of examples.

Behind the good news, though, there has been a steady decline in many species and habitats, and targets to halt biodiversity loss have not been met. This is an important time for nature conservation, as the Welsh Government adopts a new approach to environment policy. We cover this challenging debate here. Attitudes, even among those involved in conservation, have some catching up to do. *Sand dunes on the move* discusses changing attitudes to sand dune mobility, which is now understood to be crucial to the value of this unique habitat.

Our ability to carry a rich mix of articles is not limited by shortage of subject matter or willing and able authors. It is limited by space. To tackle this, we have added four colour pages, but dropped the leaflet in the middle. It is part of our drive to give good value for money – and keep our loyal

subscribers happy! The magazines will still fit in the binders which many of you have bought, but they will allow space to cover even more subjects which entertain, inform, inspire, and challenge.

Mae mwyafrif ein herthyglau'n syrthio i dri chategori cyffredinol: rhoi gwybodaeth fanwl am blanhigion, anifeiliaid, lleoliadau neu gynefinoedd; disgrifio'r gwaith a wneir yng Nghymru i warchod natur; a chrybwyll materion amgylcheddol pwysig er mwyn tanio trafodaethau. Yn gryno, maen nhw'n ein hatgoffa o'r hyn sydd gennym, yr hyn rydym yn ei wneud a'r hyn sydd angen ei wneud.

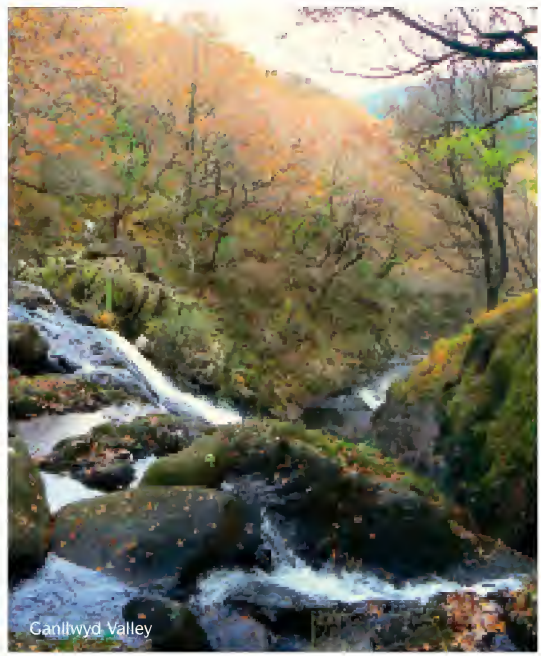
Rydym wedi gweld elfennau o'r rhain i gyd yn ein cystadleuaeth ysgrifennu 'Natur yn Ysbrydoli', ond efallai fod yna erthyglau sy'n perthyn i bedwerydd categori, sef cydberthnasau (yn bennaf rhwng yr awdur a byd natur). Mae tair yn perthyn i'r categori yma: un a ddaeth yn agos at y brig yn y gorffennol, a dwy a daeth i'r brig eleni. Gobeithio y cewch gymaint o flas ag a gefais i ar ddarllen am lyffantod dafadennog, gwalchwyfynod yr helyglys ac adar yn bwydo.

Fel cylchgrawn sy'n hoff o gofnodi, mae'n bwysig inni gynnwys erthyglau awdurdodol a diweddar am wahanol agweddau ar yr amgylchedd naturiol. Mae'r cyfeiriad at y gwymon o amgylch yr arfordir yn gyflwyniad gwych i grŵp o blanhigion pwysig a gaiff eu hanwybyddu'n aml. Dyma faes y byddwn yn dychwelyd ato. Ac mae'r erthygl ar ffyngau glaswelltir Stagbwll yn cynnwys cyfeiriad at lu o gapiau cwyrog lliwgar a ffyngau tafod y ddaear rhyfedd eu siâp, yn ogystal â thagell binc sy'n newydd sbon i Brydain.

Mae straeon am lwyddiannau ym myd cadwraeth wedi cael cryn sylw ar dudalennau'r cylchgrawn. Maen nhw'n dangos yr hyn y mae modd ei gyflawni, yn ein hatgoffa o'r pethau gwych sy'n cael eu gwneud gan gadwraethwyr uchel eu parch, ac yn tynnu sylw at yr holl bethau sydd i'w gwneud o hyd. Ar ôl ugain mlynedd yn rheoli Ynys Dewi er budd natur, a hanner can mlynedd yn rheoli Gwarchodfeydd Natur Cenedlaethol, rydym wedi dysgu un neu ddau o bethau pwysig iawn.

Ond yn llechu y tu ôl i'r newyddion da, mae dirywiad cyson i'w weld mewn sawl rhywogaeth a chynefin. Ychwaith, nid yw'r nod o roi stop ar golli bioamrywiaeth wedi cael ei wireddu. Dyma gyfnod pwysig i gadwraeth, gyda Llywodraeth Cymru yn dechrau synied yn wahanol am bolisïau amgylcheddol, ac rydym yn ymdrin â'r drafodaeth ddyrys hon yn y cylchgrawn. Mae agwedd pawb, hyd yn oed y rheini sy'n gysylltiedig â chadwraeth, ar ei hôl hi braidd. Mae'r erthygl *Sand dunes on the move* yn trafod y newid agwedd tuag at dwyni tywod symudol – rhywbeth sydd, bellach, yn cael ei ystyried fel rhan hollbwysig o'r cynefin unigryw yma.

Nid prinder meysydd difyr na phrinder awduron parod sy'n ein rhwystro rhag cynnwys llu o erthyglau amrywiol. Yr hyn sy'n cyfyngu arnom yw diffyg lle. I geisio gwella'r sefyllfa rydym wedi ychwanegu pedair o dudalennau lliw ac wedi hepgor y daflen yn y canol. Ymgais i sicrhau eich bod yn cael gwerth eich arian – ac ymgais i gadw ein tanysgrifwyr ffyddlon yn hapus! Bydd y cylchgrawn yn dal i ffitio'r rhwymwyr, ond bydd mwy o le ar gael i drin a thrafod mwy fyth o bynciau a fydd, gobeithio, yn eich difyrru, eich cyfarwyddo, eich ysbrydoli a'ch herio.



Mandy Marsh

Ganllwyd Valley

FIFTY YEARS AGO

National Nature Reserves then and now

With the establishment of the first National Nature Reserves, those charged with the conservation of nature were able to learn about, demonstrate and refine the practical skills involved in site-based conservation. Here ***MIKE ALEXANDER*** *reflects on the legacy of more than five decades of National Nature Reserves.*

Mike Alexander

When I was asked to contribute to the '50 years ago' series of articles, I must confess that the first thing that came to my mind was that it was exactly 50 years ago that I first set foot on a nature reserve. It was, as a somewhat reluctant school boy, in the summer of 1962 that I was taken to Skomer Island. From the very first moment of arrival I was completely captivated and overwhelmed by the island and its wildlife. It was on that day that I recognised what became my enduring passion for nature and wild places. Since that time these very special places, the National Nature Reserves, have dominated both my career and my life.

It was also in 1962 that the Nature Conservancy announced in *Nature in Wales* the declaration of five new National Nature Reserves (NNRs): Nant Irfon, Morfa Dyffryn, Coed Ganllwyd, Cwm Clydach and Coed Cymerau. These four new woodland and one sand dune reserves had joined the growing ranks of NNRs. By the end of 1962 a total of 23 reserves had been declared, including Cwm Idwal in Snowdonia, the first NNR in Wales, which by that time had already been in existence for six years. Together, they represent the birth of something quite wonderful: formal, government-inspired nature conservation, made possible as a consequence of the National Parks and Access to the Countryside Act 1949, one of the very first laws to protect wildlife sites in Great Britain. On average, 10 new sites have been added to the list during each decade since the 1960s, including some of the latest reserves, Skokholm Island and the Newport Wetlands in 2008. Today we have a total of 72 NNRs but, sadly, only one Marine Nature Reserve in Wales.

Mike Alexander

Morfa Harlech

Changing nature

50 years on, and what of these sites today? Do we have any evidence that NNRs deliver against their purpose and our expectation? To begin with, the five sites were declared in 1962:

Mike Alexander

Cwm Idwal

they are all thriving and in excellent health. Perhaps the most significant, and certainly most obvious, change has been at Morfa Dyffryn NNR. Once regarded as one of the most important accreting sand dune sites in Britain, it has been steadily eroding over the past 50 years. This is entirely the consequence of changes in the natural sand balance in this northern section of Cardigan Bay. Although the site has diminished in size, its qualities have been protected. The sand lost to Dyffryn is carried north to feed the magnificent dunes at Morfa Harlech NNR. Together, these two NNRs provide an outstanding demonstration of uninterrupted, dynamic coastal processes, which provide opportunities for a wide range of specialised coastal plants and communities.

There have also been changes at Coed Ganllwyd where the NNR, once managed in partnership between CCW and the National Trust, is now managed by the Trust alone. The reserve has thrived: problems with the alien rhododendron and uncontrolled grazing have been resolved, and, with its waterfall, the wet, western, Welsh, oceanic woodland is widely recognised as the richest site for mosses and liverworts in Western Europe – an amazing accolade.

Cwm Idwal, the first NNR, has become a place of experimentation and demonstration. It is one of the few places in upland Wales where it has been possible, on a large scale, to reduce grazing pressure and begin the slow process of establishing habitats that will, in the future, optimise opportunities for wildlife. We cannot know exactly what will happen in the Cwm, but we have a good idea. We know that there will be a need for some minimal intervention as we travel towards our destination: one of tomorrow's wild places where people and wildlife can exist in harmony.

One of the most exciting and innovative developments in the NNR series has been the inclusion of the Newport Wetlands. Fifty years ago, the heart of this site was no more than an industrial wasteland, a vast tip of fly ash dumped by the nearby electricity

Mike Alexander

Puffins

generating station. The reserve was established originally in mitigation for the development of Cardiff Bay, but today it has become the most wonderful semi-natural resource for the people of Newport.

Seabird citadel

What of Skomer Island, the place where it all began for me? Over the past 50 years there have been some inevitable losses. Agriculture, which had been in decline since the beginning of the century, finally came to an end in 1958, and soon after, with the exception of rabbits, grazing animals were removed. The semi-natural vegetation, which once provided for some of the land birds, has changed, but overall this is an amazing success story. Skomer is a seabird citadel. The population of Manx Shearwaters has grown, and we now believe that there are probably 316,000 pairs on Skomer. With the exception of the gulls, all the seabirds have thrived. Puffins have increased from approximately 7,000 in the 1980s to current peak counts of 12,577 individuals; guillemots have increased from around 5,000 pairs in the 1963 to 21,688 in 2011. It would be folly to claim that these successes are entirely the consequence of NNR status, but there can be no doubt that it is one of the most important factors.

Skomer is the best example of an NNR as a research station. Provisions for research, which began in the 1960s, have grown ever since. Professor Chris Perrins, University of Oxford, can claim the longest association, dating from the early 1960s. For the past 30 years he has led the production of an annual report on the survival, productivity and population changes in the important seabird populations. Professor Tim Birkhead, from the University of Sheffield, has just spent his 40th season on Skomer. He has been carrying out an essential long-running study into guillemots, looking at their breeding patterns and population change. Recently, Tim Guilford, Professor of Animal Behaviour, University of Oxford, has led studies on the shearwaters, puffins and kittiwakes, using miniature GPS loggers to track their movement and behaviour at sea. Taken together, the result of all this dedicated research is a clearer understanding of the requirements of these birds, both on and off the NNR. The more we know the better able we are to conserve, but not only on Skomer. The knowledge and skills are transferable and relevant elsewhere in the world.

In addition to all of this, thousands of people visit and enjoy Skomer each year without harming its wildlife. NNRs are places where we have achieved our aim of encouraging others to enjoy wildlife; places where we have shared our values, passions, care and respect for nature; places that can inspire others to adopt these values, in the hope that they, in turn, will learn to care.

Mike Alexander *is the Executive Director of NATUR, Chairman of PONT and the General Secretary of the Conservation Management System Consortium. He works, part-time, for CCW.*

A Living Wales?

Allard Martinius

Is there place for the beaver in the new 'Living Wales'?

The Welsh Government is introducing a new approach to nature conservation, and at the same time is changing the structure of statutory environmental bodies, merging three into one. Initial optimism that the new approach could bring real benefits to Welsh wildlife are turning to apprehension, as MICK GREEN reports.

Over the years *Natur Cymru* has celebrated many conservation successes, but they are overshadowed by the long term declines across large numbers of habitats and species. We failed to meet our target to stop declines of biodiversity by 2010 (Green 2010). We now have a new target to reverse declines by 2020, but two years into that target there are no signs of real action or improving trends. It is clear that our methods of conservation – based on protecting specific sites and species – have not worked and it is time for a new approach.

This is an important time for Welsh Wildlife – what we do now will inform the agenda for many years. Speaking to colleagues, those of us who have been working in conservation for longer than we care to mention are both excited and worried. We need to get it right and we need to start work yesterday.

The development of the Natural Environment Framework, which has become the 'Living Wales' programme, was generally welcomed, although the main concern was about how any new approach would actually be implemented. The idea of looking at ecosystems as a whole

Mick Green

Extreme contrast management at the top of Talyllyn pass, with the right hand being the 'natural' state.

rather than at individual species and habitats is in line with the Convention on Biological Diversity.

The Welsh Government decided to move towards an ecosystems approach and at the same time to completely re-organise the bodies responsible for wildlife and other management of the natural environment of Wales. The Countryside Council for Wales (CCW), Environment Agency Wales (EAW) and Forestry Commission Wales (FCW) are to be merged into one large organisation. Whether it is brave or foolish to do this all at once is a matter of opinion, but it does mean there will be a major upheaval at a time when we need to act to save our wildlife.

The new organization needs to hit the ground at a sprint and ensure it takes the landowners and conservation bodies along with it – this is no easy task but it must succeed. We can't improve on the nature of Wales but we can do a lot to aid its natural recovery and the time to do that is now – before it is too late.

Alarm bells ring

Since the initial consultations, and following a change of Minister, *Sustaining a Living Wales - A Green Paper on a new approach to natural resource management in Wales* has a different emphasis and set alarm bells ringing amongst conservationists in Wales. Equally worrying, the proposal to merge CCW, EAW and FCW seems now to be driven more by a desire to reduce perceived 'red tape', and cut budgets, than by a drive to protect nature.

After an initial nod in the direction of the Convention on Biological Diversity, the document concentrates on natural resource management, with an emphasis on what nature can do for us. For example there are five references to 'development' to every one reference to 'biodiversity'. The focus is on managing the natural environment so that it delivers 'environmental, economic and social benefits', with no mention of the need to protect nature for its intrinsic value.

Despite its promotion of an 'ecosystem approach' to environmental conservation, the document lacks ambition. This is frustrating for those of us who have long argued for less reliance on site and species-based conservation and for a more holistic, landscape-scale approach. Where mechanisms exist which, suitably adapted, could help nature in the wider countryside, such as the much derided 'Glastir' agri-environment scheme, they get a mention but no analysis of how they might deliver better outcomes for wildlife.

Much of the document discusses 'streamlining' the consents and licensing processes. More efficient processes could benefit wildlife, but the aim could simply be to make life easier for developers, at the expense of the environment.

The organisational and policy changes are going ahead, regardless of the worries of conservationists across Wales and beyond. The new organisation, and its new Chair and Chief Executive, will need the

support of conservationists to ensure it succeeds in its task. However, we need to be critical friends – the leaders of the new organisation need to be held fully accountable and make sure they reverse the declines in our wildlife. The same applies to their political masters and civil servants, who are calling the shots.

The voluntary community has an important role to play both in holding the new body to account and continuing to monitor species and habitats. We have a fantastic tradition of 'amateur' natural history in Wales – regularly celebrated by *Natur Cymru* and its predecessor journal. The long term studies and monitoring projects undertaken by individuals and organisations need to be continued and funded.

Much of my work is in the uplands, which I know best. Here there has been a serious decline in the productivity of the ecosystem. This means fewer invertebrates, less food on up the food chain, and now declines in the predators at the top. The only way to address this is to restore the ecosystem.

An end to micro-managing habitats?

An ecosystem approach should encourage a more holistic, hands-off approach to management. We have been inclined to want to micro-manage habitats. Perhaps now is the time to think about a more wild approach. With changing climate the geographical range of our habitats and species is going to change and the ecosystems that support them will be changing. We should think about letting areas develop themselves and not be worried about changes in the relative abundance of individual species as long as we provide the space for healthy and resilient ecosystems to develop. This does not mean 'abandoning' the land. It means identifying areas where our input can be minimal and we can allow fully natural ecosystems to develop.

This will also mean considering the re-introduction of some species that act as keystones in ecosystems. The beaver is probably the most attractive species for re-introduction into our countryside. Elsewhere across Europe this species has been re-introduced and shown to be important in helping to naturally manage ecosystems with little impact on people. Work by the Wildlife Trusts that shows the feasibility of this has recently been published and appears to have been accepted as a possibility by the Welsh Government.

I would welcome comments on the above – I think it is important we debate these issues as the new approach develops. I hope I will then be able to report the main issues raised in future editions of *Natur Cymru*: contact me at **Mick@gn.apc.org**

Mick Green has worked in many areas of Welsh conservation over a long period. He is currently a Director of the independent consultancy Ecology Matters.

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Cymru Fyw?

Ar y cychwyn cafodd dull newydd Llywodraeth Cymru o asyniad am warchod natur – dull yn seiliedig ar wasanaethau ecosystemau – ei groesawu. Roedd yn cynnig cyfle i droi cefn ar y modd y câi darnau bach o gynefinoedd eu rheoli, gan ganolbwyntio yn hytrach ar adfer ecosystemau ar raddfa fawr. Ond mae'r newid cywair yn y Papur Gwyrdd diweddar yn destun pryder. Yn waeth fyth, efallai nad yr amgylchedd sydd wrth galon a chraidd y bwriad o uno cyrff amgylcheddol Cymru.

A little bird told me

Lewis Collard http://lewiscollard.com/

Do you enjoy feeding the birds? If you're reading this magazine I guess you probably do. But should you?...

Last winter I was showing my granddaughter the bird table. She was fascinated by the blue tits hanging upside down on the peanut feeder. As they jostled for the best positions, it set me thinking.

Why are we feeding them peanuts? Surely they don't come from this country and anyway don't they grow underground? And what about fat balls – what's in them? And mealworms – what are they?

I decided to do a bit of "silver surfing". I discovered a lot of information out in the ether. Peanuts, I discovered, are an excellent source of protein and fat. But inferior quality peanuts can harbour harmful moulds. Being an OAP, I try to shop economically, perhaps my peanuts aren't good enough. One web site advised me to look for the BSA symbol.

Next time I was shopping I looked for the BSA standard symbol but only found BTO logos on many wild bird food brands. I looked at fat balls and couldn't find a table of contents. Processed food for people must list ingredients, but not wild bird food apparently. Mealworm packets had no information on them at all. It was time to google again. Mealworms, I discovered, are the larvae of the darkling beetle, Latin name, *Tenebrio molitor* – found all over the world, their job is to hoover up stuff.

Googling some more (it is addictive), I found feeding dried mealworms may be convenient but can cause dehydration. Aren't birds clever enough to take drink when they need to?

All this negative information was disturbing. On the RSPB site Ian Hayward suggested other foods I can feed, porridge oats, cake crumbs, potatoes, grated cheese and windfall fruit. Hooray, things that are already in my larder; no toxins, no nameless fat, no dry baby beetles.

But what about the bigger issues? Am I guilty of upsetting the natural order, creating a dependency culture, spreading disease? It was time to ask a Welsh expert. Peter Jennings, county bird recorder for the Radnorshire Wildlife Trust, pointed out that: "Feeding wild birds is bound to influence the survival of individuals and species but I think the natural order of things is totally upset by man's influence in all countries anyway, especially heavily populated

ones such as ours, with virtually no natural habitats left." That was sort of reassuring.

Research in Australia however, tells a different story, "....provision of nutritionally inappropriate (eg. high fat or carbohydrate content) feed may lead to birds becoming too fat or more prone to a range of health disorders." Must I now become a dietician for my feathered friends?

The Daily Telegraph also set me worrying. "Feeding bread to ducks is cruel. White bread has very little protein or roughage and encourages the young birds to put on weight very rapidly causing the heavier soft tissue to pull their wing bones out of alignment... can lead to severe distortion and even death." It seems I should stop taking my granddaughter to feed the ducks in the park.

When it comes to health issues I became alarmed after reading a piece by Professor Hawley from Glamorgan University "...the threat of avian flu mutating into a form which could be passed between people 'absolutely' remained on the radar". Oh help! I checked the World Health Organization's web site and was relieved to find the following: "Fortunately, the virus does not jump easily from birds to humans or spread readily and sustainably among humans."

But further internet searching informed me that there are many other diseases to which wild birds are susceptible. One is Trichomonosis, a parasite that affects pigeons, doves and birds of prey. Although it doesn't affect humans it seems it can spread to finches through "food or drinking water contaminated with recently regurgitated saliva or possibly droppings of an infected bird". Time to give my bird feeding stations a hygiene overhaul.

Further reading was alarming: it appears that *E.coli*, *salmonella* and *campylobacter* are common in wild birds and can be passed to humans. Potentially, feeding the birds is bad for us!

What then is the best thing I can do to encourage birds into my garden without jeopardizing their

Wikimedia Commons: KoS

wellbeing as well as my own? Garden plants are an obvious source of nutrition, protection and nesting sites. But were my plants good enough? Checking out the web site www.wildaboutbritain.co.uk gave me a few pointers. "Ferns and thistles provide great nesting materials. Conifers and laurel give a good source of cover....Cotoneaster, pyracanthus and holly ....a source of natural food for visiting birds." I have some of the above, but I shall plant more. www.britishbirdlovers.co.uk suggest sunflowers, honesty, cornflowers and foxgloves for their seeds. They also mention climbing plants being useful for cover and food, eg. ivy, clematis and honeysuckle. Non-native trees should be avoided as they don't "support the native insects that the birds need to feed off". More food for thought.

I have learned a lot. It seems that feeding birds is potentially fraught with problems. The food, the ecology and health of wild birds is disturbed by man's interference. But what should a googling granny do? Should I stop feeding the birds? I think not. But I will take on board everything that that little bird "google" has suggested, but remembering the old saying about a little learning being a dangerous thing. In future I intend to feed more natural foods, move my bird table now and then to minimize health problems, give everything a spring clean and endeavour to grow more bird-friendly plants.

Man has meddled with nature since forever, I hope I'm doing little harm and perhaps some good. It's a question of equilibrium, best summed up by The Prince of Wales, "Life seeks balance.....When it is in balance, when there is harmony, the organism is health."

***Merlin Evans** was runner-up in the 'Inspired by Nature' competition 2010-11*

All fungi images: David Harries (credit)

Stackpole

a treasure trove for grassland and dune fungi

The Stackpole National Nature Reserve in south Pembrokeshire is deservedly recognised for its coastal scenery and natural diversity including a wide range of plants, invertebrates and lichens. The property is owned by the National Trust and managed in conjunction with the Countryside Council for Wales. Here ***DAVID HARRIES*** *introduces some of the fungal gems which add to the interest of this remarkable place.*

Limestone waxcap *Hygrocybe calciphila*

My involvement in serious mycological recording at Stackpole started in 2007 when, as a local member of the British Mycological Society (BMS), I was asked to find a suitable location for a week-long residential foray in October for over 30 fungus enthusiasts and specialists.

My attention focussed on the Stackpole National Nature Reserve. A site visit showed that the National Trust facilities at the Stackpole Centre were ideal – the site offered good accommodation near to an extensive area of maritime calcareous grassland supplemented with sand-dunes, dune-grassland and remnants of coastal limestone heath: enough to satisfy any grassland enthusiast. Woodland specialists were well served by the extensive lakeside woodlands and marshy scrub areas.

Prior to the BMS foray the only significant records for the estate covered the decade from the early 1990s when Natural History Museum expert Peter James recorded fungi whilst surveying lichen

communities, and Maurice Rotheroe collected dune and grassland records for his surveys of grassland and dune systems for the Countryside Council for Wales (Rotheroe, 1995).

The BMS foray proved very successful and helped to highlight the wealth of fungal interest on the site. This led to further mycological visits including one by Dr Eef Arnolds, a leading European expert on waxcap grasslands, in 2008, and a return visit in 2011 accompanied by Rob Chrispijn, the President of the Dutch Mycological Society.

Waxcap grassland

The species-rich coastal grassland and the adjoining dune-grassland at Stackpole provide an ideal well-drained, nutrient-poor environment for many waxcap species and other fungal groups sharing the same ecological niche. Waxcap grasslands are in decline throughout western Europe with a reported loss, in some countries, of over 90% of suitable semi-natural grassland habitat during the 20th century (Senn-Irlet, et. al., 2007).

Typical species which are prominent at Stackpole include the Persistent waxcap *Hygrocybe autoconica* and Dune waxcap *Hygrocybe conica var. conicoides*, which add a splash of vibrant colour to the dune areas from late summer onwards. Less common species include *Hygrocybe colemanniana*, recorded just a couple of metres from the cliff edge, and *Hygrocybe nitrata* which has a faint, though characteristic, nitrous smell reminiscent of a chemical laboratory.

Pinkgills, so named because the gills turn pink as the spores mature, can be present in large numbers during late summer – and usually include the aptly named Mousepee pinkgill *Entoloma incanum* which has rather distinctive smell. And if the smell isn't enough to identify the specimen, then the tendency of the pale yellow-green stem to develop a vivid blue-green colour when handled provides adequate confirmation.

Other groups well represented at the site include

Earthtongues *Geoglossum atropurpureum*

earthtongues, which appear as dark brown/black tongue-like fruitbodies just a couple centimetres high – easily missed until you get your eye in. More colourful are the club and coral fungi – usually delicate spindles or branched fruiting bodies, mostly white, yellow or, in one case, pink.

Fungus highlights

Red Data List (RDL) fungi are well represented at the site with a recent discovery of the Dune inkcap *Coprinopsis ammophilae* in the fore-dunes. This species is very much a dune specialist and occurs in association with the dead leaves and stems of Marram grass *Ammophila arenaria*.

Another striking fungus quite at home in loose sand at the front of dune systems is the Dune Cup *Peziza ammophila*. This species, normally found in spring or early summer, shares the same habitat as the Dune inkcap but is more frequently recorded, appearing as cups up to 50 mm wide.

Moving from dunes to dune grassland, where the combined effect of blown shell sand and the underlying limestone provides a basic substrate, we find two more of Stackpole's RDL fungi. The first is the Limestone waxcap *Hygrocybe calciphila*, an attractive orange-red species which, as its name suggests, is restricted to alkaline soils. Fruiting bodies can appear from late

Persistent waxcap *Hygrocybe autoconica*

summer into the autumn and produce caps up to 25mm in diameter.

Several interesting Pinkgills have been recorded including the Excentric pinkgill *Entoloma excentricum* which is rarely recorded in the UK but can occur in large numbers during a good season at Stackpole. The fruiting bodies usually appear in the late summer, are creamy-white in colour, and may grow to 50 to 60mm in diameter.

A recent find from nearby grassland proved to be an even rarer pinkgill. A rather nondescript brown mushroom keyed out as *Entoloma fridolfingense*. However, as this was not listed as a British species it required verification by a specialist before being accepted on the UK checklist. Fortunately Eef Arnolds was happy to oblige and readily confirmed the species (Harries, 2012).

The coastal grassland at Stackpole also provides good opportunities for finding uncommon species. The UK Biodiversity Action Plan (UKBAP) priority species, the Big blue pinkgill *Entoloma bloxamii*, is a chunky and attractive mushroom found during most autumn seasons. A more recent find was another UKBAP grassland species, the less easily identified Dark-purple earthtongue *Geoglossum atropurpureum*. This was the first time the species had been recorded in Pembrokeshire, though this is perhaps not surprising as it requires inspection of microscopic features to separate it from other superficially similar species.

This article can only scratch the surface so far as Stackpole's mycological interest is concerned, but it is clear that the site hosts some notable and rare examples of dune and grassland fungi with the potential for many more exciting finds in the future. The presence of a local group, the Pembrokeshire

Mike Alexander

Stackpole Quay

Hydrocybe nitrata smell is reminiscent of a chemical laboratory

Fungus Recording Network, will help ensure a steady flow of new records from Stackpole.

Particular thanks are due to staff at the National Trust and Countryside Council for Wales for their continuing support for fungus recording at Stackpole Warren National Nature Reserve.

***David Harries** is the County Fungus Recorder for Pembrokeshire and a Volunteer at the Stackpole National Trust site.*

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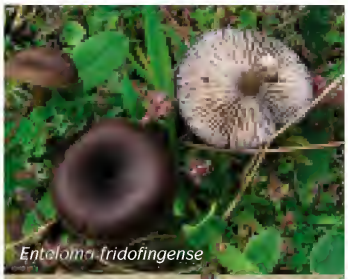
National Trust by-laws prohibit the collection of fungi from NT sites without permission. The fungus recording activities, and the collection of voucher specimens referred to in this article, were carried out with written permission from the National Trust and the Countryside Council for Wales.



Entoloma fridofingense

Dune inkcap
Coprinopsis ammophilae

Dunecap *Peziza ammophila*

Stagbwll – ynys o ffyngau ysblennydd

Mae casgliad rhyfeddol o ffyngau glaswelltir a ffyngau twyni prin a nodedig wedi cael eu darganfod yng Ngwarchodfa Natur Genedlaethol Stagbwll yn ne Sir Benfro, yn cynnwys nifer o gapiau cwyrog lliwgar ac amlwg, fel *Hygrocybe calciphila*, ffyngau tafod y ddaear, a gwahanol fathau o dagellau pinc – doedd un o'r rhain ddim wedi'i gofnodi ym Mhrydain o'r blaen. Y disgwyl yw y bydd mwy o ddarganfyddiadau cyffrous yn cael eu gwneud, diolch i Rwydwaith Cofnodi Ffyngau Sir Benfro sy'n weithgar yn yr ardal.

John Ratcliffe

Sand dunes on the move

Ground level chaos and aerial order of Newborough dunes. Note the 4 main lines of primary dunes behind the shore and the parabolic blow-outs created by the wind.

Not long ago sand dunes were viewed as fragile places, from which people needed to be excluded, for fear of erosion. Now that very process of erosion is seen by many as crucial, yet it is hard to restore. ***JOHN RATCLIFFE*** *describes the reasons for this turn around, and the importance of spreading the message: sand dune movement is good.*

One of the forbidden pleasures of a trip to the dunes is running, sliding and rolling down the sandy slopes. After decades being told to "stay off the dunes, don't cause erosion", new concepts of dune conservation suggest that we need to embrace erosion as the driving force of healthy dunes. Should children be encouraged to cause as much damage as possible?

The challenge of hot, dry sand dunes, the waterlogged intervening "slacks", poor soil, and salt wind, can only be tolerated by plants and animals adapted to these extreme conditions. This diversity of challenges is matched by a diversity of responses and wildlife. Plants like marram grass have waxy in-rolled leaves to survive the desert conditions, or winter growth and rapid spring flowering and seeding like the early sand grass, to use the brief moist growing season. Insects such as the vernal sand bee, nesting in warm bare sandy banks, the sandhill rustic moth, feeding only on sand couch grass, or the sand

John Ratcliffe

Early sand grass *Mibora minima*, a typical open dune species, exploits mild, moist winter conditions and lack of competition, flowers early (March) then aestivates over the inhospitable dry summer. It is found on most of the dunes of Anglesey's west coast.

lizard, dependent on open sandy "hunting grounds" to catch its prey, typify adaptation to this environment. So sand dunes are some of the richest areas for nature in Wales.

Specialist wildlife

There are 6200ha of sand dune habitat in Wales (Blackstock et al 2010), just 0.003% of the country, yet they support an extraordinary diversity of life. At Newborough Warren over 1000 species of beetles alone have been recorded. Of 439 species of vascular plants recorded on dunes in Wales, some 32 are entirely dependent on this habitat; and of over 5000 species of invertebrates recorded in dunes, over 450 are obligate dune specialists. The pioneer dune habitats are important in supporting the majority of scarce plant and animal species most dependent upon dunes habitats, by providing warm, open substrates, reduced competition, germination sites and hunting grounds: 70% of the specialist dune invertebrates, many of them rare, are associated with pioneer habitats.

Dunes are dynamic systems, constantly changing. The processes of beach and dune formation are as interesting as the resulting coastal landforms themselves. Blown sand accumulates on the strand-

George Chernilevsky

George Chernilevsky

Male and female sand lizard *Lacerta agilis*. Sand lizards, reintroduced to dunes at Ynyslas, Morfa Harlech and Talacre Warren, need warm soft sand for their eggs and open ground for hunting their prey so are found in open, mobile dunes.

Paul Harris

The Sandhill rustic moth feeds only on sand couch grass

line, to be colonised by marram grass, building new ridges, scoured by the wind down to the water table, and rolling inland or eroded with the winter storms and returning to the sea. Beach forms change over days and weeks, foredunes build and erode over the seasons and dunes can move several metres a year. Seen from the ground, dunes can seem just a chaotic mass of hillocks; seen from the air, a pattern is apparent and the history of the landscape becomes clearer.

Each stage in the evolving succession from embryo dune to dune grassland, slack, and finally dune scrub or dune heath, carries a distinctive flora and fauna. But the early pioneer stages with bare sand and open vegetation are particularly important for a large suite of dune specialists found in no other habitat.

Stabilizing dunes

For decades concern with erosion, especially associated with human activity, led to a policy of stabilisation and control. Erosion is unpredictable and threatening. Landowners feared a loss of assets and in the past mobile sand blocked drains and covered roads. Managers planted marram grass and fenced the dunes with chestnut paling and conifer brash to preserve the current state rather than allow unpredictable change. The public were warned to behave and guided off the delicate dunes. Nature reserves were fenced off and left alone.

The policy was preservation, but perhaps not conservation. Coupled with other factors such as off-shore sand dredging, hard shoreline engineering, beach groynes, afforestation, lack of grazing, myxomatosis in rabbits, and higher CO_2 and nitrogen pollution encouraging increased plant growth, it led to reduced sand influx and the stabilisation of most Welsh (and European) dunes. This in turn has led to the widespread loss of bare sand and early pioneer habitats and their associated biodiversity. Mobile dunes now occupy only 6% of the dune habitat resource, compared with over 70% in the 1950s, while the area of bare sand has fallen to less than 2% of Welsh dune habitats, with many important sites well below that figure. Today, most Welsh dunes have only tiny areas of bare sand and the early pioneer habitats essential for this rich flora and fauna. The exception is Morfa Dyffryn, where there remain large areas of mobile dune over 30% of the system, though even here there has been a major reduction from former times.

A new approach

This policy was challenged in the early 1980s by Dutch and Danish ecologists who argued for a more *laissez faire* approach to dune erosion, and then for active intervention to remobilise dunes and to create new pioneer habitats. Dutch coastal managers, who maintain the sea defences of much of the country, embraced and practice this concept of dynamic ecosystem management. Their policy is to work with natural processes, to roll the sand inshore and thereby strengthen their soft natural sea defences, rather than holding a hard artificial line which may fail catastrophically. Dunes provide one of the chief areas of open space for much of the Dutch population, so this policy had to pass intense public scrutiny.

This is a paradigm shift in coastal management. The new policy is to encourage and emulate natural forces to restore dynamism to dunes. We know how

Scott Hand

Kenfig NNR dune rejuvenation

to stop dune mobility, the problem is how to start it again and then maintain it! Clearly this must be done with care for other stakeholders' interests. Every site will require a suite of measures tailored to its situation. At Kenfig National Nature Reserve near Porthcawl, the Countryside Council for Wales, Bridgend Borough Council, the Trustees of the Kenfig Estate and Plantlife, with the support of the Welsh Government, have created a large breach in the coastal dune to channel the wind onto exposed sand and encourage continued movement of sand. At Talacre Warren near Prestatyn, 300,000m^3 of sand dredged from the Dee estuary was pumped onto the beach to supply fresh sand to the frontal dunes. In some sites, recreational paths constitute the only bare sand and dune mobility left: perhaps there is a case for orienteers and horse riders to assist dune management. Different locations will require local solutions, but for now the challenge is to change our perception of dunes: from a rippling sea of green to a complex mosaic of constantly shifting sands, grasses, wetlands and scrub, for that is the essence of a healthy dune environment.

And yes, perhaps the children have a part to play in this.

John Ratcliffe *works for the Countryside Council for Wales on protected area management.*

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Dune formation

Mike Alexander

Ailfywiogi twyni tywod

Mae twyni'n gynefinoedd eithafol: bryniau sych, pantiau gwlyb, tywod yn symud byth a beunydd, a fawr ddim maetholion. Ond mae'r amodau anodd yma'n caniatáu i lu o blanhigion ac anifeiliaid arbenigol ffynnu, gan gyfoethogi eu cymeriad a'u harddwch. Mae'r hen syniad o ddiogelu twyni tywod trwy eu gwarchod rhag erydu wedi ildio'i le bellach i'r syniad fod twyni rhy sefydlog yn fygythiad gwirioneddol i'r cynefin. Anos o lawer na'u sefydlogi yw cael twyni i symud unwaith eto. Ond mae prosiectau yng Nghynffig a Thalacre yn dangos beth yn union sy'n bosibl. Efallai fod gan blant ran i'w chwarae trwy annog twyni i symud yn naturiol.

Simeon Jones

The sand dunes of Pembrey Burrows

Embryo dune

The management of a remarkable sand dune system in Carmarthen Bay has taken a great deal of work and innovation to put current thinking about increased dune mobility into practice. ***SIMEON JONES*** *describes the large dune system known as Pembrey Burrows and goes on to discuss recent restoration work that has been undertaken in parts of the dune system. This has included sea buckthorn removal and the re-introduction of grazing.*

Carmarthen Bay has one of the most varied geomorphological coastal features in the British Isles. The rivers Taf, Towy and Gwendraeth enter the sea between the Carboniferous Limestone headland of Worms Head on the Gower Peninsula and Caldey Island in the west.

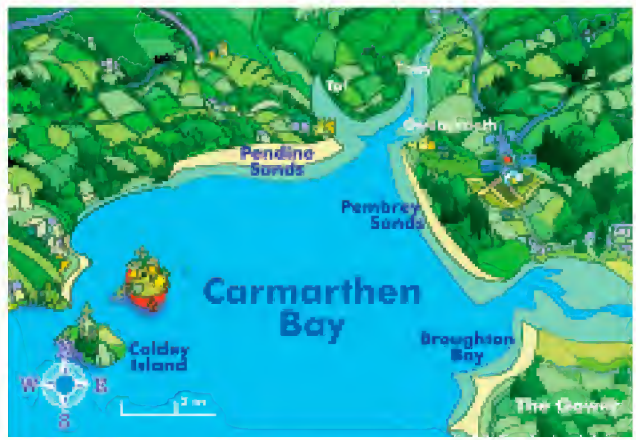
Think Carmarthen Bay, then think sand dunes – or at least sand dunes should spring to mind. Much of this shallow sand-filled bay is home to three major sand dune systems. At low tide three interconnected units are exposed, namely Pendine Sands in the west, Pembrey Sands in the middle and Broughton Bay in the east.

This was well known in the days of sail. The geomorphological manifestation of Carmarthen Bay apparent to sailors was the Carmarthen Bar. Extending to a length of some four miles at the mouth of the river Towy, it made shipping quite treacherous by its ever changing presence, such that the river was "sore pestered by sands and shelfs."

Pembrey Burrows

The Bay also contains one of the largest assemblages of unmodified

sandy beaches in Britain: the best example of a spit and barrier beach dominated by south-westerly Atlantic wave conditions, Pembrey Sands, is up to nine miles long (the beach itself is known as Cefn Sidan). This spit and barrier system makes up one of the key geomorphological features in the bay. It is linked to the mainland by former dunes and reclaimed marshland, in the coastal lowland that stretches between the villages of Pembrey and Kidwelly. This large dune system was known as Pembrey Burrows.



The majority of the dunes were planted with Corsican Pine in the 1920s to become Pembrey Forest, whilst Sea Buckthorn was also brought in at this time to 'stabilise' the dunes. In the early 20th century a Royal Ordnance Works and a wartime airfield were built. The site of the former ordnance works became Pembrey Country Park in the 1980s.

Pembrey Forest

Pembrey Forest is planted sporadically with Corsican Pine and smaller patches of Sitka Spruce and Lodgepole Pine. The various stands of dune oak woodland and wet woodland are an interesting feature, while sea buckthorn fills the foredunes.

At present a programme of thinning and clear-felling of some areas is being carried out by the Forestry Commission. There are plans to diversify the pines and to have more native species.

Pembrey Burrows and Saltings

The spit at the eastern end of this large sand dune system is known as Pembrey Burrows and Saltings and is owned by Carmarthenshire County Council. The sand dunes make up just over 300 acres whilst the saltmarsh covers 270 acres.

The importance of the dunes is reflected in its conservation designations. Pembrey Burrows and Saltings is part of Carmarthen Bay Dunes Special Area of Conservation, and the bay forms part of Carmarthen Bay and Estuaries European Marine Site. Restoration work funded by the Countryside Council for Wales (CCW) has been ongoing for the last five years.

This dune spit, and Towyn Point at the other end of Pembrey Sands, is of relatively recent origin and most likely formed after the Middle Ages. The supply of sediment is sufficient to allow the beach to grow in overall volume and also to sustain the lateral growth of the spits, which have grown by several hundred metres during the last 150 years. Miles of rare embryo dunes have recently formed extending in a southerly direction into the bay.

If left to its own devices most of this dune spit would retain its ungrazed sward containing a substantial amount of thatch. The small rabbit population would maintain areas of lawn whilst sea buckthorn would

Nikolay Yushnikov

Sea buckthorn
Hippophae rhamnoides

slowly expand to fill most of the reserve, jeopardizing the dune's rare flora and fauna. This is the fate of the majority of the nine miles of foredunes all the way up to Towyn Point at the western end of Pembrey Sands. Hence the priority for the dune restoration work has been the removal of sea buckthorn and the introduction of grazing.

Sea buckthorn removal

Not all the properties of sea buckthorn are perceived as being negative. It is a very useful plant and in some parts of the world it is harvested for its beneficial properties. It also provides a food source for winter birds and is utilised by various other mammals and invertebrates.

Initially complete removal of sea buckthorn was envisaged: however, it would be unfeasible economically and undesirable ecologically to completely remove it. The goal is to manage sea buckthorn as a mosaic with varying levels of cover. Removal of sea buckthorn was first attempted in 1996 when seven acres were removed, whilst further clearance of 29 acres was carried out from 2004 to 2010.

In the fields that are grazed by cattle the dune grassland is maintained with small stands of sea buckthorn at concentrations of between 10 and 25%. These can also be used as shelter for livestock. In the remaining unfenced areas sea buckthorn occurs at higher concentrations of between 25 and 50%. As stands reach maturity some are cleared, creating a diversity of different age structures. This is a cost-efficient way of managing sea buckthorn as the older stands are far easier to remove and regrowth tends to be less, if not absent.

In unfenced areas rabbits graze open areas of grassland. The sea buckthorn offers them a safe refuge although they are just as likely to burrow in open dune grassland as they are under the plants. Extensive areas of rabbit-grazed lawn occur at the upper end of the saltmarsh dune interface. Here sea buckthorn stands have been left in order to maintain the rabbit population.

Burning the sea buckthorn was undertaken in the following year. The piles were first turned to shake off sand and to allow small mammals etc to escape. Regrowth has been flailed, however repeated flailing has not completely prevented regrowth and in some areas may need to be chemically treated. Only areas of dense regrowth after flailing would be treated, to prevent excessive chemical use and to maximise cost efficiency.

Japanese Rose *Rosa rugosa* has also been removed with the weed rake and buried in the same location, with minimal regrowth.

Grazing

Winter grazing was much valued at Pembrey Burrows, like other major sand dune systems, due to the dry, sandy conditions underfoot even in the wettest of winters. The dunes were grazed from a series of farms between the foredunes and marshland, including Penybedd, Towyn Mawr and Towyn Canol. Bulwarks or sea walls were first noted before 1681, with subsequent ones added in the 18th and 19th centuries. However, Pembrey Burrows and Saltings have not been grazed for a number of years.

A grant from CCW paid for fencing around 215 acres and grazing was restored by a local grazier in 2006. Initially grazing with bullocks was confined to the winter months and numbers were high at 1.5 cattle per hectare. Supplementary feeding, which was needed at this stocking level, caused eutrophication and an increase in ruderal plant species, hence the feeding areas were subsequently turf stripped. Numbers of animals were therefore reduced and now

grazing is set at 0.25 cattle per hectare. Grazing has been extended all year round without the need for supplementary feeding – even in the recent harsh winters there were always areas of grass available.

An increase in grazing density could be envisaged, for example to create more bare sand, while avoiding supplementary feeding. The cattle would need to be removed at fairly short notice and the dunes left for a period to recover.

Two new ponds were also created to provide fresh water for the stock. To date none of the ponds has completely dried out in summer: however, the levels have become low and in these conditions cattle have been removed due to excessive dunging in the ponds.

Conclusion

The amount of bare sand in the dunes has increased with recent work such as removal of sea buckthorn, excavation of ponds, turf stripping and trampling by livestock. Bare sand is needed by rare annuals and also by a host of invertebrates, and this should be maintained. A move to more traditional cattle breeds would prove beneficial and low rabbit numbers should be maintained where there is little evidence of myxomatosis.

The dunes are being managed in a similar way at Towyn Point and further work to manage sea buckthorn is ongoing in Pembrey Country Park. This could be extended in the narrow foredune strip along Cefn Sidan between the beach and forest. Currently there seems to be adequate sediment supply for the active dune building processes on the site, although we do not know yet what the long term effects of coastal protection and sand dredging are.

One man-made catalyst of change that is already having an effect is sea level rise. This may not only affect the burrows, but also the protected marshland behind. Notions of working with the natural system and allowing a dynamic coastal system to develop seem to be holding sway. The landscape would be subject to natural change and a shifting dune system where the challenge would be of finding ways to protect biodiversity within this moving landscape.

Finally, are attitudes towards nature changing? Instead of thinking that we can overcome nature, perhaps we are slowly beginning to work with nature instead.

***Dr Simeon Jones** manages the reserve on behalf of Carmarthenshire County Council.* *With thanks to CCW, staff, contractors and volunteers who have carried out much of the work, and to the grazier.*

Simeon Jones

Evening primrose *Oenothera spp.* and Dune pansy *Viola tricolor subsp. curtisii* on bare sand

Twyni Pen-bre

System dwyni fawr ym Mae Caerfyrddin yw Twyni Pen-bre. Ers tro byd, roedd tywod noeth y twyni wedi bod yn dirywio, gan fygwth creaduriaid di-asgwrn-cefn a phlanhigion unflwydd prin. Ond mae cyfres o brosiectau i adfer y twyni'n gwneud yn iawn am hyn. Mae'r gwaith yn cynnwys cael gwared â rhafnwydd y môr, cloddio pyllau, cael gwared â thyweirch a sathru gan dda byw. Ac mae'n ymddangos bod digon o dywod ar gael i adeiladu twyni. Does neb yn gwybod beth fydd effaith hirdymor y cloddio am dywod a'r amddiffynfeydd môr mewn mannau eraill ar hyd yr arfordir, nac ychwaith beth a ddigwydd wrth i lefel y môr godi; ond mae'r newid agwedd a'r parodrwydd i weithio gyda natur yn arwydd calonogol.

All photos: Francis Bunker

Seaweedy seascapes

Fine-veiled crinkle weed *Cryptopleura ramosa*

Plants are synonymous with landscape, giving it colour and texture. Seaweeds are similarly an indispensable part of what makes our seascapes, and deserve greater recognition. ***FRANCIS BUNKER*** *takes us on a tour of some of these often colourful, always fascinating plants.*

In the shallow coastal waters around Wales seaweeds characterise the underwater seascapes. Wales has a rich and diverse seaweed flora, with communities changing from exposed locations like the Smalls (rocky outcrops 20 miles offshore in Pembrokeshire) to the shelter of the Inland Sea (a shallow intertidal area on Anglesey). I'd like to explore some of these special seaweedy seascapes with you.

One of the most familiar seaweed seascapes, both to divers and those peering over cliff tops, are the kelp forests. Kelp plants favour shallow water with plenty of light. From the surface the kelp canopy appears as a foreboding dark mat extending offshore into the depths of the sea. Underwater, sunlight sparkles through the shallows and plays on the dark brown fronds which divide into ribbons, wafting to and fro in the swell. Fish linger, knowing that they can dart for cover in the dense undergrowth. In the dim world beneath the canopy, kelp stipes, up to

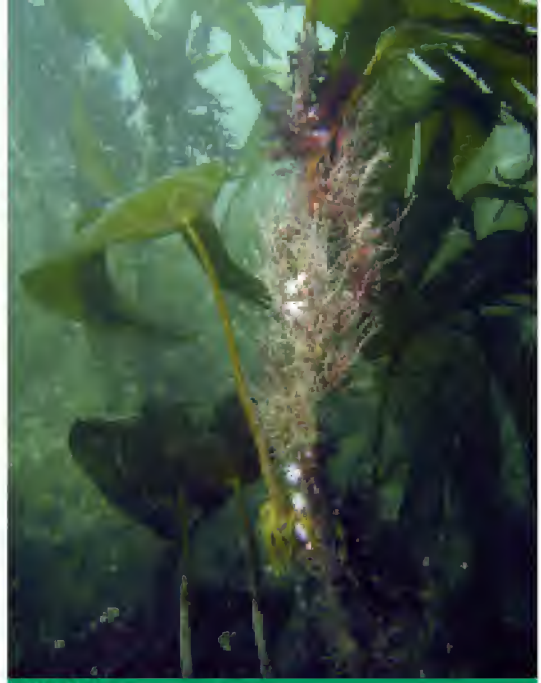
two metres tall, sway easily to the motion of the sea, anchored on the rocky seabed by branching holdfasts spreading out like tree roots exposed above the ground. The commonest kelp species around our coasts is the Northern kelp *Laminaria hyperborea*. Others are found too, including a southern species known as Furbelows *Saccorhiza polyschides* and the more opportunistic Sugar kelp *Sacchorina latissima*.

Kelp forest is found wherever the seabed is rocky. It provides a home for hundreds of other species, with red seaweeds often dominating the seabed below the canopy. These include the Beautiful fan weed *Callophyllis laciniata*, Sea beech *Delesseria sanguinea*, Sea oak *Phycodrys rubens*, Rosy fan weed *Rhodymenia pseudopalmata* and Fine-veined crinkle weed *Cryptopleura ramosa*. Vertical surfaces are frequently colonised by little rounded tipped growths of the Shaded weed *Schottera nicaensis*. Small brown seaweeds are also found on the kelp forest floor with common species including Divided net weed *Dictyota dichotoma* and Netted wing weed *Dictyopteris membranacea*. These species glint with a blue iridescence in the early summer. The Gulf Stream warms our coastline and mixes with colder Atlantic waters allowing more southerly species to thrive in some more open coast locations. The southern species include the Rainbow weed *Drachiella spectabilis* that irridesces to a bright blue colour and Berry wart cress *Sphaerococcus coronopifolius* that lives part of its life cycle as a dark red, paint-like crust on the rocks.

Into deeper water

As the seabed slopes towards deeper water, kelp plants thin out and the seabed is dominated by a turf

Celtic maerl *Phymatolithon calcareum* with creeping maerl weed



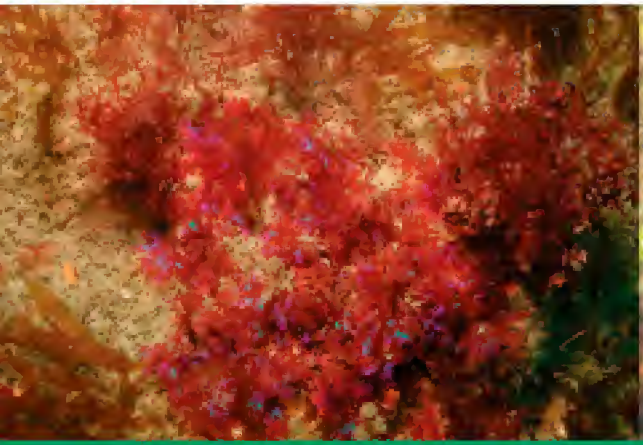
Kelp forest

of more delicate red and brown species. Although many of the species living on the kelp forest floor still survive here, a whole host of other species come in to the mix. Some, like Beautiful eyelash weed *Calliblepharis ciliata* are tough and robust. Others are more diaphanous. Flat tongue weed *Erythroglossum laciniatum* forms a thin transparent growth with fine veins and Bonnemaison's fern weed *Bonnemaisonia asparagoides* is delicate and finely branched.

At a depth of around 20 meters the foliose seaweeds disappear and the rocky seabed becomes dominated by ghostly grey white and brown animal colonies with sponges giving splashes of colour. The only seaweeds to thrive in this deeper water are the coralline pink paint weeds that grow very slowly at low light intensities.

Bootlaces, siphon weeds and maerl

Plains of seaweed covered cobbles and pebbles are distinct features of the coast, for example at the Sarns that stretch out into Cardigan Bay. In summer, long fronds of the Bootlace weed *Chorda filum* form an almost impenetrable barrier to a swimmer and seem to hang in the water like vines in a jungle. Some seaweeds have become specialised to live on



Rainbow weed *Drachiella spectabilis*

Beautiful eyelash weed *Calliblepharis ciliata*

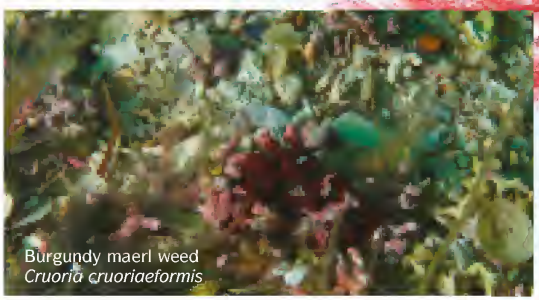
the unstable rocks that are moved around in storms and scoured by surrounding sediments. Uncommon species occur in such habitats, such as the pink-red Naccari's hairy weed *Naccaria wiggii* and Mrs Griffiths's hairy basket *Spyridia griffithiae*.

Parts of the seabed along the north coast of Tremadog Bay have a very unusual habitat of gravel overlying clay. In shallow water the bootlace weed seascape is found once again but here delicate siphon weeds *Polysiphonia spp*. and several rare species colonise the gravel and bind it together to form a stable mat. Rarities include the Spindle weed *Atractophora hypnoides* and the very special Bearded twig weed *Anotrichium barbatum* with its whorls of hair-like branches, found nowhere else in Britain.

The final seaweed seascape I'd like to take you to is a small but special area near my home in Milford Haven, and site of the only maerl bed known in Wales. Maerl is a calcified seaweed which forms branching, pink, twig-like medallions, and there are two species present in Milford Haven; the common Celtic maerl *Phymatolithon calcareum* and the less common Southern maerl *Lithothamnion corallioides*. Maerl grows very slowly at only a few millimetres a year but, over time, because it isn't attached to the seabed, it forms sediment waves. The Milford Haven maerl bed is small (less than 1 km in length) but it is old, with fossilised pieces dating back 2000 years. Maerl provides a home to several rare and endemic seaweed species. These include the encrusting Burgundy maerl weed *Cruoria cruoriaeformis* that forms dark red patches on the maerl and the Creeping maerl weed *Gelidiella calcicola* that wraps the maerl pieces together like parcel string.

This has been a lightning tour which has highlighted some of the common and less common habits in Wales which are characterised by the seaweeds which live there and form our seaweedy seascapes.

***Francis Bunker** is a freelance marine biologist and underwater photographer, chief author of the best selling* Seasearch Guide to Seaweeds. *If you want to learn more about seaweeds, contact the British Phycological Society www.brphycsoc.org*



Burgundy maerl weed
Cruoria cruoriaeformis

Sea beech *Delesseria sanguinea*

Divided net weed *Dictyota dichotoma*

Planhigion gwymon

Mae gan ddyfroedd arfordirol Cymru blanhigion gwymon toreithiog ac amrywiol sy'n cytrefu mewn ardaloedd mor wahanol â'r Smalls (brigiad 20 milltir allan yn y môr) i ddyfroedd bas Môr Mewndirol Ynys Môn. Oddi ar Aberdaugleddau ceir yr unig safle yng Nghymru ar gyfer Maerl, sef gwymon calcheiddiedig sy'n tyfu'n araf iawn. Mae gwastadeddau o goblau a cherrig crynion sydd wedi'u gorchuddio â gwymon yn nodwedd arbennig o'r arfordir, gyda rhai wedi addasu i fyw ar y creigiau ansad sy'n symud yn ystod stormydd. Ni cheir gwymon coch barfog *Anotrichium barbatum* yn unlle arall ym Mhrydain.

Bonnemaison's fern weed *Bonnemaisonia asparagoides*

Twm Elias

Hen lwybrau a ffyrdd porthmyn

allweddau i ddeall y tirlun

Hen bont garreg uwchben Arthog ym Meirionnydd
Old stone bridge above Arthog, Meirionydd

Mae rhwydwaith o lwybrau wedi ei ysgythru ar y tirlun. Gellid yn hawdd anwybyddu ei arwyddocâd. Yma mae ***TWM ELIAS*** *yn datgelu'r gwerth a geir o'i ddarllen a deall ei arwyddocâd i dreftadaeth a bywyd gwyllt.*

Ble bynnag yr ewch i gerdded yng nghefn gwlad Cymru mi ddowch ar draws rhwydwaith eang iawn o lwybrau hen a newydd. Mae'r rhain yn rhan bwysig o'n treftadaeth hanesyddol a gall olrhain eu hanes ddweud llawer am ddatblygiad y tirlun a'r newidiadau fu yn economi a ffordd o fyw y gymdeithas wledig dros y canrifoedd. Gall rhai hen ffyrdd, llwybrau a phontydd ddarparu troedle annisgwyl i rai mathau o fywyd gwyllt.

Rhwydwaith ar ben rhwydwaith

Llwybrau troed a ddatblygwyd dros gyfnod maith at ddefnydd gwlad yw'r mwyafrif ohonynt ac fe'u defnyddid i gysylltu ffermydd; i gyrraedd gweithle; fel llwybrau pysgotwyr a llwybrau postmon neu er mwyn cerdded i bentre, ysgol neu gapel. Atynt, dros y degawdau diwethaf gallwn ychwanegu llwybrau cwrteisi i hwyluso hynt cerddwyr a llwybrau hir megis Llwybr Clawdd Offa a'r Llwybr Arfordir newydd.

Yn yr ucheldir yn bennaf ceir llawer o lwybrau hanesyddol nad ydynt bellach yn cael eu defnyddio i'w pwrpas gwreiddiol ac sy'n adlais o gyfnodau ac amgylchiadau tra gwahanol i heddiw. Gallant fod yn lwybrau cynhanesyddol; yn ffyrdd Rhufeinig; llwybrau pererinion; llwybrau masnach Canol Oesol; ffyrdd y goets fawr; llwybrau smyglars; llwybrau symud anifeiliaid; ffyrdd cludo calch; hen reilffyrdd a ffyrdd trol a llwybrau gweithwyr i chwareli a mwyngloddiau.

Yn yr 20fed ganrif daeth ffyrdd at gronfeydd dŵr, ffyrdd coedwig a ffyrdd amaethyddol newydd – yn cynnwys y 'ffyrdd marchnad gyffredin' neu 'ffyrdd CAP' oedd mor ffasiynol a nodweddiadol yn y 1980au pan roedd grantiau Ewropeaidd ar gael i agor ffyrdd igam ogam hyd y llethrau i alluogi ffermwyr i gyrraedd ac aredig yr ucheldir. Does dim diwedd ar greu rhwydweithiau newydd – llwybrau beicio mynydd a ffyrdd at felinau gwynt yw'r diweddaraf.

Llwybrau symud anifeiliaid

O ran yr economi wledig mae'n debyg mai'r llwybrau symud anifeiliaid oedd bwysicaf. Mae'r rhain yn cynnwys ffyrdd porthmyn a llwybrau symud defaid cadw (neu ddefaid tac). Roeddent yn eu bri cyn i'r trên gyrraedd yn yr 1850au - 60au, pryd y gwelwyd cryn newid yn y patrwm o symud gwartheg ar draws gwlad o Gymru i ganolbarth Lloegr[1]. Roedd trycio anifeiliaid ar y rheilffyrdd yn llawer cynt (diwrnod o daith yn lle pythefnos ar droed); yn rhatach (roedd costau tollau ffyrdd, llety dros nos a phorfa i'r creaduriaid yn sylweddol) ac yn llawer caredicach i ddyn ac anifail.

Mae'r stori yn wahanol o ran defaid am fod marchnad fewnol sylweddol iddynt gartref ac nid oedd amryw o'r hen lwybrau yn cyd fynd yn gyfleus â'r rheilffyrdd. O ganlyniad parhaodd bugeiliaid i symud defaid ar droed tan y 1930au – 40au pan ddaeth hi'n hwylusach i'w cludo ar loris. Un a wnai hyn ddechrau'r 20fed ganrif oedd William Edwards, Penmaen, ger Dolgellau[2]. Teithiai ef ar gefn ceffyl

Twm Elias

Yr hen ffordd rhwng Cwm Hesgen a Phennant-Lliw, Llanuwchllyn
The old road between Cwm Hesgen and Pennant-Lliw, Llanuwchllyn

drwy Gwm Hafod Oer a thros y mynydd i Aberllefenni, Glantwymyn, Dylife ac ymlaen hyd fryniau Tregaron cyn belled â Nant Stalwyn i brynu myllt (ŵyn gwryw wedi eu sbaddu ac a gedwid ar y mynydd tan yn 4 oed). Cawsai help bugeiliaid Tregaron i gerdded y myllt cyn belled ag Eisteddfa Gurig lle byddai dynion Dolgellau yn aros amdanyn nhw. Ymlaen wedyn hyd lethrau agored Pumlumon i Ddylife ac adre i Ddolgellau. Yno byddai'n gorffwyso am ychydig cyn symud y defaid unwaith eto i'w dosbarthu i ffermydd yn ardal Llangernyw a Llansannan yn yr hen Sir Ddinbych i'w pesgi dros y gaeaf ar swêj.

Pedwaredd Cynhadledd Prosiect Llên Natur (Cymdeithas Edward Llwyd), 24 Tachwedd 2012, Plas Tan y Bwlch, Maentwrog

Bywyd Gwyllt a'r Cymry

Cynhadledd i ddathlu ac i wyntyllu perthynas y Cymry ag anifeiliaid a phlanhigion, ddoe heddiw ac yfory

Wildlife and the Welsh: a conference to celebrate the relationship between plants, animals and the Welsh, yesterday, today and in the future (24 November, 2012)

- **Anifeiliaid yn Y Mabinogion**
  Yr Athro Gwyn Thomas
- **Gwasanaethau Ecosystemau**: gwerth economaidd rhywogaethau a'r amgylchedd
  Morgan Parry (Cadeirydd Cyngor Cefn Gwlad Cymru)
- **Tair canrif o newidiadau amaethyddol yng Nghymru a'u heffaith ar fywyd gwyllt a chefn gwlad**
  Twm Elias, Darlithydd, Canolfan Astudio APCE ym Mhlas Tan y Bwlch…a llawer mwy

£12 yn cynnwys cinio'r Plas (£6 heb ginio). I archebu eich lle cysylltwch ag Ifor Williams, Gwelfa, Llanfaglan, Caernarfon LL54 5RD (01286 686509)

This will be a Welsh language conference. There will be simultaneous translation facilities where needed.

Defaid cadw

Yn aml byddai rhai o'r hen lwybrau yn cael eu defnyddio i symud defaid o'r ucheldir i aeafu ar lawr gwlad. Un enghraifft yw'r hen ffordd borthmon adnabyddus dros Fwlch y Rhiwgyr yn Ardudwy. Cyn dyddiau'r rheilffordd arferai porthmyn gerdded gwartheg ar hyd y ffordd hon i Ddolgellau ar eu taith i Loegr. Defnyddiwyd yr un ffordd i symud defaid cadw i'r cyfeiriad arall yn yr hydref a chofiai John Plase, Dinas Mawddwy, gerdded defaid o Fawddwy dros Fwlch y Rhiwgyr yn 1929 i fferm ger Harlech[4]. Disgrifiai fel y byddai rhyw 5 – 6 o breiddiau yn teithio yr un pryd, un ar ôl y llall ryw ¼ milltir oddi wrth ei gilydd, â'r bugeiliaid yn aros nos ar ffermydd yn Harlech cyn ei throi am adre drannoeth. Yn y gwanwyn byddent yn dod i gyrchu'r defaid yn ôl i Fawddwy, eto dros Fwlch y Rhiwgyr.

Newid dull a newid stoc

Daeth y rheilffyrdd â sawl newid yn eu sgîl, yn cynnwys newid o ran natur yr anifeiliaid eu hunain[5]. Cyn i'r rheilffyrdd gyrraedd nid oedd llawer o ddiben gwella ansawdd y creaduriaid – pa werth cael anifail tew ac yna ei gerdded 200 milltir i'w werthu? Marchnad i wartheg stôr oedd yn Lloegr, a'r unig beth oedd ei angen yno oedd fframiau yr anifeiliaid – y porwyr Seisnig a'r tiroedd breision fyddai'n rhoi y cig ar y ffrâm ac yn gwneud yr elw mwya.

Agorodd y rheilffyrdd gyfleon marchnata newydd i wartheg mewn gwell cyflwr ac aeth rhai ati o ddifri i wella'r brid. Sefydlwyd Cymdeithas y Gwartheg Duon Cymreig yn ne orllewin Cymru yn 1873 ac un arall yn y gogledd yn 1883 cyn cyfuno'r ddwy yn 1905 i ffurfio'r brid modern[6]. Ar y llaw arall ychydig o wella fu ar y defaid mynydd hyd nes canol yr 20fed ganrif oherwydd credai pobl ei bod yn hanfodol cadw caledwch y preiddiau os oeddent am oroesi'r gaeafau oer a arferai ddigwydd yn llawer amlach na heddiw.

'Oes Aur' gyntaf amaethyddiaeth

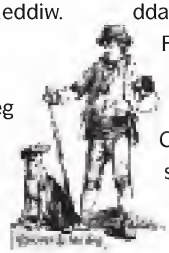
I wella ansawdd y gwartheg ar ddiwedd y 19eg ganrif roedd hi'n angenrheidiol hefyd i wella tiroedd a dulliau porthi fel y gellid cael y gorau o botensial yr anifeiliaid. Gwelwyd gwelliannau mawr ar lawr gwlad a chaeau gwaelod ffermydd mynydd a bu cryn wella ar ansawdd y ffriddoedd yn ogystal. Yn yr 1850au – 70au buddsoddodd y stadau'n drwm mewn adeiladau fferm i'w tenantiaid a'u hannog i fabwysiadu dulliau gwell o amaethu. Arweiniodd hyn at Oes Aur amaethyddiaeth, pryd y gwelwyd mwy o dir yn cael ei amaethu nag erioed cynt, na wedyn.

Dirwasgiad a dirywiad

Daeth tro ar fyd cyn diwedd y ganrif wrth i bolisi Marchnad Rydd y llywodraeth adael i fwyd rhad o dramor lifo i'r wlad gan danseilio'r economi wledig ac arwain at ddirwasgiad amaethyddol a barhaodd, fwy neu lai, hyd at ganol y 1930au. Erbyn hynny roedd tua 2/3 o fwyd y wlad yn cael ei fewnforio ac roedd yr arfer o fugeilio (a olygai symud y defaid mynydd yn rheolaidd er mwyn iddynt wneud defnydd llawnach o'u cynefin) wedi dirywio. Roedd myllt (oedd yn cadw rheolaeth ar y porfeydd garwaf) hefyd wedi mynd allan o ffasiwn. O ganlyniad dirywiodd ansawdd y borfa fynydd a bu newid sylweddol yn ecoleg yr ucheldir. Aeth llawer o ffriddoedd dan redyn, brwyn neu eithin a throdd llawer o ffermydd bychain mynyddig yn adfeilion. Cynigiwyd coedwigaeth fel achubiaeth i'r ucheldir a phlannodd y Comisiwn Coedwigaeth gannoedd o filoedd o aceri o goed duon.

Daeth tro arall ar fyd adeg rhyfel 1939–45 pan ddaeth rheolaeth dros amaethyddiaeth i ddwylo'r 'War Ag', oedd â'r dasg enfawr o dyfu digon o fwyd i gynnal y wlad yng ngwyneb blocâd yr Almaenwyr ar fewnforion. Arbedwyd y boblogaeth rhag llwgu drwy ddogni bwyd a defnyddio tractorau 'Caterpillar' ac aradrau 'Prairiebuster' o America i aredig a thyfu ŷd ar y ffriddoedd.

Roedd hyn yn rhagflas o'r oes fecanyddol fodern ddaeth ar ôl y rhyfel pan ddisodlwyd y ceffyl gan y Ffergi bach a phryd y gwawriodd ail Oes Aur (fecanyddol y tro hwn) amaethyddiaeth yn y 1960au – 70au. Daeth ymuno â'r Farchnad Gyffredin â chyfleoedd newydd a grantiau sylweddol i aredig tirroedd grug a draenio corsydd. Yna, pan ystyriwyd costau amgylcheddol y polisïau hyn, bu tro pedol a



Twm Elias

Hen ffordd, Islaw'r Dref, Dolgellau • Old road, Islaw'r Dref, Dolgellau

sefydlu yn y 1990au gynlluniau amaeth-amgylcheddol a grantiau i adfer grug a chorsydd.

Ecoleg llwybrau

Gall rhai planhigion ar lwybrau gwelltog neu ffyrdd glas wrthsefyll pwysau traed pobl ac anifeiliaid yn well na'i gilydd[7] gan ffurfio cymunedau arbennig gaiff eu cydnabod yn y Dosbarthiad Llystyfiant Cenedlaethol (NVC), e.e. OV21 a 22[8]. Mae rhai o enwau'r planhigion hyn yn ein hatgoffa o'r cysylltiad sydd ganddynt gyda llwybrau, e.e. gwellt llwybrau (*Poa annua*) a llydan y ffordd (*Plantago major*).

Bydd adeiladwaith rhai hen ffyrdd megis cloddiau, pontydd a seiliau yn rhoi lloches i wahanol greaduriaid ac yn cynnig cynefinoedd i gen, mwsoglau a phlanhigion. Ceir ambell enghraifft, brin erbyn hyn, o goeden bîn â chlawdd o'i chwmpas. Plannwyd y rhain gan borthmyn i nodi'r cyfeiriad ar draws tir agored[9]. Deuai'r borthmyn hefyd â choed ffrwythau o berllannau Lloegr a dywedir bod ambell un i'w gweld o hyd gerllaw hen furddunod yn ucheldir Ceredigion.

Yn sicr gall dealltwriaeth o hanes a phwrpas hen lwybrau roi i ni allwedd i ddatgloi cyfrinachau'r gorffennol. Ond yn bwysicach, gall deall deinameg hanes y tirlun roi seiliau cadarn i ni i ddehongli'r hyn a welwn a chynllunio gwarchodaeth well i'r dyfodol.

*Mae **Twm Elias** yn ddarlithydd a threfnydd cyrsiau ym Mhlas Tan y Bwlch, Canolfan Astudio Parc Cenedlaethol Eryri.*

I weld map o lwybrau a ffyrdd y porthmyn, gweler y clawr ôl.
For a map of the drovers' roads, see back cover.

Cyfeiriadau

1) *Welsh Cattle Drovers*, R. Moore-Colyer (2002), tud. 108
2) *Atgofion am Deulu o Borthmyn*, Gordon Edwards, yn Fferm a Thyddyn 20 (1997), tud. 33
3) Ar gefn ei Geffyl, Richard Phillips (1969), tud.11
4) *Defaid*, Twm Elias (heb ei gyhoeddi)
5) *Gwartheg*, Twm Elias (2000), tud. 62
6) *The Best of Breeds – a history of Welsh Black Cattle*, Jenny Buckton (2004)
7) *British Plant Communities*, Cyf. 5, Gol. JS Rodwell (2000), tud. 394
8) *The British Islands and their Vegetation*, Cyf. 2, AG Tansley (1949), tud. 496
9) *Y Porthmyn Cymreig*, Twm Elias (1987)

Old Paths and Drover Routes

A network of paths has developed over centuries in the Welsh countryside. It is full of historical interest, tracing the changing fortunes and practices of the rural population, and revealing much about the development of the landscape. This network also provides unexpected footholds for wildlife. Paths, such as the drove roads and tracks which enabled farmers to move animals, help to unlock secrets from the past, enable us to understand more about what we see, and help us plan for the future.

Inspired by Nature at Dinefwr: Natur Cymru *writing competition*

The first ever Literature Festival for Wales, held at Dinefwr Park over the last weekend of June, made a perfect setting for presenting the prizes for this year's nature writing competition. Chris Kinsey, the runner up in 2010, received a £500 cheque from WWF Cymru for her winning entry, **The Hawk Moth Effect**. In presenting the prize Gillian Clarke, who was also one of the judges, said *'...it wasn't pretty or decorated, it was exciting, the prose ran, it had muscle, it had information, it had a story ....'*

Huw Jenkins

Liz Fleming-Williams, Chris Kinsey, Gillian Clarke, and Eloise Williams at Dinefwr Literature Festival

In second place was last year's winner, John Harold, with an article titled **How I fell in love with the frog lady**. His prize was a £500 voucher for the residential nature writing course at Tŷ Newydd, the National Writers' Centre for Wales based in Lloyd George's house near Criccieth. You can enjoy both of their articles which are published in the following pages.

The third prize winner was Eloise Williams, who won an overnight trip for two to Skomer Island, sponsored by The Wildlife Trust of South and West Wales (WTSWW), with an article titled **I carry your heart with me**. In fourth place was Liz Fleming-Williams, who won a dolphin survey boat trip for two, sponsored by Dolphin Survey Boat Trips, for her article **Snow on a Raven's Wing**. In fifth place was Rob Collister, who won a meal for two at the Glasshouse Café in the Wildlife Centre at Cilgerran, sponsored by WTSWW, for his article **In my backyard**.

What made Dinefwr so special for me? It was the combination of literature and nature against an idyllic setting. Literature was in abundance with writers galore, plus musicians and dancers – although I can't comment on their performances, I was too busy chatting to people at the *Natur Cymru* stall in the porch of Newton House. We shared a stall with WTSWW's Lizzie Wilberforce, who co-led a guided nature walk with Ray Woods into Castle Woods, the Wildlife Trust's reserve adjacent to Dinefwr Park. About thirty set off in their boots immediately after the prize-giving: it must have been good, that was the last I saw of them.

The atmosphere of the festival was 'can-do'. Despite all sorts of teething problems, including a massive marquee being declared unsafe to enter, the show went on. National Trust staff and volunteers made us very welcome and even Lord Dinefwr came over to say hello. So much more Welsh and personal than Hay, though

unlike Hay's 'pay as you go' model, a weekend pass was priced at £65.

Some people attending the prize-giving ceremony were disappointed that the winning articles were not read out. To remedy that we have arranged for some of them to be performed at the William Condry Lecture in Machynlleth on Thursday 4th October (see page 36).

Next year's competition? After four consecutive years of running a writing competition we have decided to give it a rest. Instead we are planning to hold an art competition with the winning entry to be used as a *Natur Cymru* front cover – details to follow.

Huw Jenkins

Elephant hawk moth – from the unusual position of the wings, probably newly emerged from the pupa

Philip Sims

The Hawk moth effect

June 13th 2011, London's burning and the moon in Powys is in tatters. At 12.45 a.m. I step out to clear my head of frets about energy policy – wind farms and pylons – and meet dizzy pink flickering. It takes a moment to adjust to the speed of elephant hawk moths looping the light and see their flux of colours: fuchsia, willow herb and honeysuckle, as if these moths really are what they eat. The moon clears from sooty clouds. One moth breaks free from orbiting the porch light. The second is slower breaking the spell. I see its shocking pink body and underside clearly as it navigates off.

The flight brushes me back to the June night I released 'my' elephant hawk moth. I was ten. Late one Friday night, I carried the beautiful imago to my aunt's hedge with more care than a wise king in a nativity play – I was bearing the gift of metamorphosis.

The night was hot, humid and drenched in the scent of honeysuckle. I removed the muslin lid. The moth was as inert as a brooch. As I slid the lamp-glass from the dried-out remains of willow herb there was a whisper of movement in the antennae. Breeze or orientation? I held my breath gazing at the girly pink delta wings with their lime counter-shading, traced the inner white trim separating wing from thorax then skipped to the cord-white legs and slightly frayed but not very feathery antennae. It was perfect: no battered edges or tired, transparent patches. It

flapped to warm up its muscles, and then blurred and flew. I was surprised by the sudden sideways and backwards lift-off. Most moths I encountered then were stiff and dead. I lurched to allow flight, but it was instantly lost in the profusion of honeysuckle. Gone.

Inwardly I felt as frantic as the moths beating the porch light. I wanted to see it strike nectar, watch the long proboscis uncoil, dip and suck. The adults around me went indoors but I was rooted by regret and rage. I wanted to repossess my moth. I'm now better able to take William Blake's advice and, "kiss each joy as it flies".

Hawk moths, sphingidae, are specially adapted to rapid, sustained, flight. Some achieve speeds of 30mph. They are the stealth bombers of the moth world and I like to think they're the prototype of the delta-wing Vulcan bomber planes that haunted mid-Wales when I first moved here. Both rely on speed and agility to evade attackers. In the moth's case this is bats, and bats were cruising the street lamp. Sensitive to scents and flowers' u.v. radiation, they are prime agents of night pollination. However, the hummingbird hawk moth is seen hovering by day. I first saw these exotics in 2006. One drew a friend I'd lost touch with and me to the same valerian in Llanidloes. We vectored in awe of the orange blur. Last September warm, southerly winds brought them back to my garden.

Rather than bothering with flowers, the death's head hawk moth tends to rob bee hives direct. During my first visit to Ynys Enlli in 2007 I was presented with a death's head moth and filled with ambivalence, not for the creature's superstitious properties but for its capture and containment in the fridge. It was brought out in a cellophane tube in a state of suspended animation and yes, we could observe its skull-marked thorax, marvel at its dark brocade and amber markings. It was poked to reveal yellow under wings but too lethargic to emit the shriek which mimics the queen bee's.

I was uncomfortable with this indulgence of curiosity though I didn't have such qualms in 1966. I needed persuading to set the moth I raised free. Part of me wanted to keep it at least until Monday so that I could show my headmaster. A darker part of me wanted to pin it and preserve it like a proper lepidopterist whose bequests I'd ogled in the museum.

My educational achievements were boosted enormously by stealing a larva. As soon as I told my headmaster that I had an elephant hawk moth chrysalis he took much more interest in me. We met regularly to discuss nature sightings. My theft was prompted partly by rampant curiosity and partly as an act of revenge on a new neighbour who blocked up my access to the river Lugg and its water meadows. As I kicked his new hurdle and sign, I spotted something which looked like a saved-for-a-second-smoke cigar butt on the base of his concrete garage, and ran for a jam jar.

Sensing capture, the thing started moving vigorously forwards – much further and I'd risk exposing myself to the mysterious neighbour. I swooped, narrowly missed the free-roving trunk-like snout with the edge of the glass and jumped back into our garden. In the secrecy of the shed I examined my captive and was shocked by the Alice-in-Wonderland transformation. Gone was the exploring snout. A creature with a swollen head and four evil eyes was staring me out, hypnotising me with its sway. I fixed on the horn poking from the other end and thought about throwing it back, but mum called me for dinner.

She wanted to see what I had. We looked up what it ate and I ran out to pick some willow herb. It didn't eat though. Immediately, it started spinning white silk threads and weaving a cocoon in a kind of mesmeric jive. By bedtime it was a chrysalis with less apparent life than the wilting willow herb. I kept it on my bedside table and nurtured it with faith. This faltered when nothing had happened by early June. I told my headmaster I thought it was dead and he encouraged me to keep it a bit longer. Of course it cheated by emerging when I was at school, but I was still thrilled by the brilliant adult.

Chris Kinsey

Michael D. Smith

Broga or llyffant?
Common toad *Bufo bufo*

How I fell in love with the frog lady

Walking down the lane to meet me the torch in her hand blinks to and fro, a friendly fragment of starlight. She's wearing one of those hi-vis jackets, a big man's coat keeping out the damp on this dark February evening.

With her other hand she carries a bucket. I can't see inside but I can hear distinctive plaintive cries from within; it is full of little chicks cheeping, pip-peep, cheep-chip-peep. The sound is enchanting, cute, moving.

She engages me in conversation in her native language, chatty and vivacious, a gorgeously flirty forty-something. I can't quite make out the features swathed by her coat; the hood protects her from rain which spits sporadically on this warm blustery night.

The dancing light of her torch lifts from the grey-black wet tarmac. The bright beam shifts and shortens as she aims the shaft plumb down into her bucket and as I look inside they are illuminated, the little creatures – my God! Hideously transformed, squirming crawling skin-bags, clawing and grasping in their dozens; not chicks but toads, lumpen and prehistoric, driven by procreative urges, almost automata, beasts with two backs or more, shameless, grasping each other, males with males, the odd bulky female escorted and mounted by many males, an old testament sin in cold amphibian skin.

Looking down I suddenly see dead bodies around me, everted innards, gaping pink tongues of fresh roadkill, dark husks of older corpses. I hear plaintive echoes of skin-breathing brethren; more toads, trapped in the storm drains.

What sorcery is this? I wonder, as this strange woman begins to weave her story. Every year, she tells me, as winter yields to the first yearnings of spring, her creatures come to her in hordes and on the blackest wettest nights she comes out to collect them. These toads are her familiars, they flock to her by night, unknowingly entrusted to her protection.

As I listen to her I learn more, and the wind and the talkative toads form the soundtrack, the background to my growing understanding of this, her work.

I learn that we had been speaking at cross purposes. In my arrogance I thought she had mistaken toads for frogs, could not tell the difference. To her a toad is broga, to me it is llyffant, and vice versa. You say broga, I say llyffant, let's call the whole thing a north-south contrarian misunderstanding. So we settle for sharing an ancient tongue and use the latin names to avoid misunderstanding. I tell her the toad is *Bufo bufo* - from bufare - 'to puff up' - a last-ditch defence used against predators which have not yet discovered how bad a taste toadskin will leave in the mouth.

We find a lonely frog among the multitude of toads in her bucket and hold frog and toad side by side for comparison. I show the differences in skin texture, head shape, eye pupil. We observe the different styles of locomotion. I describe the differences in habitat, ecology, and biology. Together we observe the sexual dimorphism and note the different vocalisations. I learn from her direct observations, her experience of life after dark.

I learn that their migration actually starts in the

autumn but is held up by the cold of winter.
I learn that there are four times as many males as females.
I learn that toads have external fertilisation.
I learn that males compete to ride in amplexus, on a female's back, grasping her like a vice with their forelegs.
I learn that males may a surround a female in a mating ball, each striving to pass on his genes to at least some of her eggs.
I learn that her name is Gwen.
As the toads return each year, so am I drawn back each night. There is magic, fascination, and growing understanding.

Why do they come here? And why do Gwen and her troupe of fluorescent, bucket-wielding toad patrollers come here? We carry the toads together by the bucketload and release them in the big pond – wide and deep, too cold for frogs and newts. We release them and in a single moment we know the answer – why they come, why we come. We are, suddenly, in awe of them, not pitying or patronising, our opinion of the toads transformed by their own transformation – suddenly they are swimming free, elegant, tuned, at ease in their aqueous element. We see them as they are meant to be, amphibians, born of water, still tied to water in their rites of spring. As athletes they glide away from the muddy bank's alchemy, a second metamorphosis, base creatures transmuted, gold and copper flecks in their eyes.

The toads are precious in their vulnerability, ancient evolution exposed by the new reality of cars and roads, headlights and white lines. The pond itself, though, is a gift back to them from uncaring humanity: dug out in an orgy of excavation some thirty years ago, it could have been custom built for toads. It has become a stronghold, a place of pilgrimage, a man-made amphitheatre for amphibians to stage their 300 million year old performance. The males come first, like migrant swallows, and wait in cold open water for the females: this mass migration is temperature dependent. The females concentrate in the vegetated areas where spikes of horsetail provide good anchorage for their twin strands of spawn. I wonder how the toadpoles manage to develop in this deeper water, so much colder than the shallows where frogs would spawn.

I think of the return migration, and of the mass exodus of toadlets later in the year – I remember the surrounding fields one year, a black moving carpet of minute migrants, a million animated crumbs for crows.

What other examples of terrestrial migration do we have in our islands? In these interrupted landscapes the special biology of amphibians has begun to lose its grip as roads take their toll. Isolation kills. The road carves its way between communities, through lives. Gwen and her fellow villagers are reaching across it together, to each other, to the toads, to me. I know there are other threats to the toads, other causes, but I have fallen in love with these simple acts of compassion.

John Harold

William Condry Lecture 2012
Lichens and the Mystery of Life

MOMA Wales, The Tabernacle, Machynlleth.
Doors 7 p.m. Thursday, 4 October, 2012
Tickets: £5.00 including refreshements

This year's Condry Lecture will be given by Ray Woods, one of Britain's foremost authorities on bryophytes, and an outstanding and encyclopedically knowledgeable lecturer. The evening promises to be an enthralling event! "I've seldom experienced a greater sense of wonder in nature – the symbiotic gift of an exceptional communicator and a tiny organism that seems quite insignificant. Until you learn to look." (*The Guardian*, on Ray Woods).

There will be two readings by *Natur Cymru* competition winners before the lecture at 8pm.
www.thecondrylecture.co.uk

Janet Baxter www.janetbaxterphotography.co.uk

Ynys Dewi - Ramsey Island

Time to take stock

Ramsey Island/Ynys Dewi

Twenty years ago RSPB Cymru acquired Ramsey Island and started addressing the threats to its birdlife, such as that posed by the infestation of brown rats. Here the RSPB warden LISA MORGAN describes the dividends of this work, and the challenges of working in a hostile but exhilarating environment

Ynys Dewi / Ramsey Island lies just two miles west of St Davids, separated from the mainland by the notorious Ramsey Sound and her Bitches and Whelps. RSPB Cymru has a long association with the island and the beautiful Pembrokeshire coastline. 'Watchers' were appointed on both sides of the Sound, to safeguard birds and their eggs, after a Pembrokeshire County Council protection order was passed in 1923.

However, it was not until 1992 that the opportunity arose for RSPB Cymru to secure the outright purchase of the island. Negotiations had been challenging as the primary conservation objective to clear land-based predators from the island was met with caution by the trustees, who were adamant that nothing should be killed. Following a great deal of impassioned diplomacy, the sale was finally agreed in November 1992.

261 hectares in size, (including Ramsey's offshore islets and the Bishops and Clerks), the site was designated a National Nature Reserve in 1996 and is arguably the most dramatic and rugged of the Pembrokeshire

Lyndon Lomax

Manx Shearwater *Puffinus puffinus*

islands. Ramsey's highest peak on Carn Llundain stands at 136 metres, affording breathtaking views of the National Park to the east, Skomer to the south and, on a clear day, the Irish hills to the northwest.

Twenty years ago it was clear that Ramsey's biodiversity was suffering due to the invasion of brown rats, *Rattus norvegicus*, which had occurred during the 1800s. It is most likely that this voracious predator came ashore from coastal trading boats anchored offshore or from the many ships that wrecked around the island's coastline during that time. Feral cats were later introduced to help combat the rat problem and catch rabbits, but also became a serious threat to the island's native wildlife.

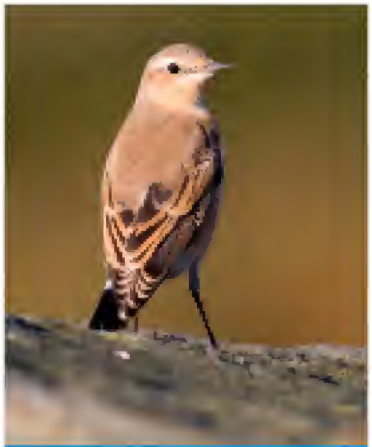
The number of burrow-nesting seabirds on the island had been severely limited by the presence of rats and, to some extent, land usage. Manx shearwater *Puffinus puffinus* numbers were suppressed at well under 1000 pairs, despite the apparent suitability of the habitat for this iconic bird, which breeds in internationally important numbers on the south Pembrokeshire islands. Another casualtywas the Atlantic puffin, *Fratercular arctica*, and although small numbers breed on the North Bishop, the puffin is now absent from Ramsey. The species had bred previously, with the last breeding record being of a small isolated colony on the island's north east coast in 1894.

During the winter of 1999/2000, a dedicated team of RSPB staff and volunteers set to work on a rat eradication project that would involve nine weeks of hard work, 165kg of poisoned bait and the relocation of a dozen feral cats before it was complete. Under the professional guidance of a New Zealand company, who had pioneered the technique for removing introduced rodents on their own islands, the project was a fantastic success and remains the most significant conservation achievement since RSPB Cymru took ownership of the island.

An early result following rat eradication was the rapid increase in the wheatear population. Returning from their wintering grounds in Africa during March, they soon set up territories and nests in the island's stone walls and rabbit burrows. They forage on the sheep-grazed grasslands to the north of the island where there is plentiful invertebrate prey, allowing them to raise their young during the spring and early summer, sometimes producing two, even three, broods in some years. With rats present, eating their eggs and chicks, numbers remained low at around 40 pairs. Since then numbers have soared to over 100 pairs, giving the island one of the densest populations in Wales if not the UK.

However, it is for seabirds that the Pembrokeshire islands are rightly famous and the restoration and recovery of Ramsey's populations was the main objective of the rat eradication project.

In June 2012 we completed the 5-yearly, whole island population census for Manx shearwater. Surveying burrow-nesting seabirds is notoriously difficult and time consuming, but we now have a robust and repeatable method in place for this work. The island is divided into sections in which the number of 'suitable' burrows had been counted. This basically means any burrow longer than my arm, which could hold a shearwater and its egg. The number of these burrows is close to 12,500, so spare a thought for the author who spent most of the winter crawling around on her hands and knees, peering into thousands of burrows! During the first three weeks in June, when adult birds are



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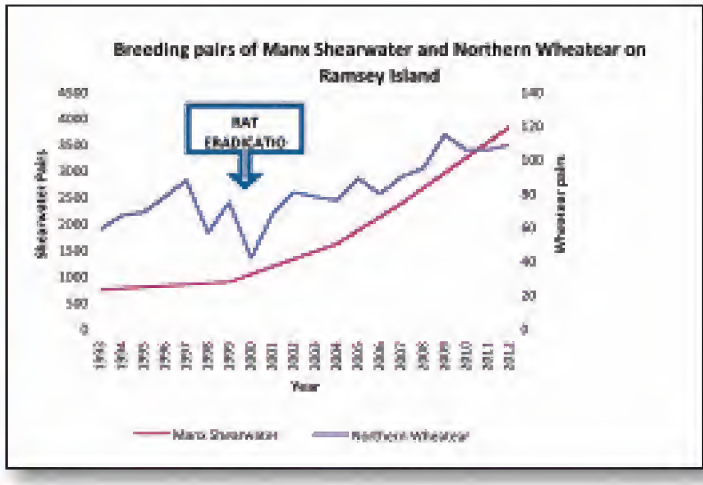
Wheatear *Oenanthe oenanthe*



underground during the daytime incubating their single egg, we are able to estimate how many active shearwater burrows there are on Ramsey.

The method relies on the fact that male shearwaters are territorial, returning to the same burrow every year. By playing a tape recording of a male Manx Shearwater call to the burrow entrance, a male bird at home will more often than not call back in order to defend its nest site. In contrast, females never respond. By playing to a random sample of all suitable burrows on the island and using a study sample of burrows to calculate a site specific 'response rate', you can, with a bit of maths, estimate the total population size. When the same study was carried out in 1999, the population was estimated at 897 pairs. In 2012 the figure is 3,835 pairs, a significant increase of over 400% since rats have been removed.

An increase in the productivity of Ramsey birds would have resulted immediately following the rat eradication. However, the shearwater is a long-lived bird with delayed reproductive maturity, not breeding until its fourth or fifth year. With this in mind, plus an average productivity of 0.6, we would not expect to see such a large increase so soon. Immigrants from other colonies appear to be swelling the Ramsey population. Possible sources are the neighbouring Skomer Island colony, which continues to expand and where competition for burrows between shearwaters and puffins is intense, or the fragile colonies on Skokholm where some burrows are being lost to erosion.

Then in July 2008 my RSPB co-warden discovered Storm Petrels, *Hydrobates pelagicus*, apparently breeding on the island for the first time. He found a small number of these tiny birds occupying the boulders and rock slabs of Ramsey's west coast. Given the time of year, the fact that these birds were present by day and that we have recorded them in subsequent years, it is certain that they are breeding here. Previous RSPB wardens had carried out extensive work in an effort to locate storm petrels breeding on Ramsey but to no avail. Ramsey now has a small establishing colony of petrels to complement the 150 pairs already breeding on the Bishops and Clerks.

The return of puffins would complete the story. However, they are gregarious birds and fiercely loyal to their natal site. Despite seeing increasing numbers on the water around the island, they seem reluctant to make that all important first landing on Ramsey. Since 2010 we have deployed 200 plastic decoy puffins on suitable cliff-top habitat with the aim of luring young, prospecting birds onto the island where we hope they will discover available breeding sites in the form of existing rabbit burrows.

Ramsey is also recognised as a nationally important site for chough, *Pyrrhocorax pyrrhocorax*. Six to

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Storm Petrel *Hydrobates pelagicus*

eight pairs nest in the island's sea caves, with productivity generally higher on Ramsey than in the remainder of the St Davids peninsula SPA. The provision of a short clifftop sward, maintained by grazing sheep and ponies, allows chough to forage for the invertebrate prey they require. The island is unusual among RSPB landholdings, in that we own and manage our own livestock. We maintain a breeding flock of Welsh Mountain ewes, ranging between 150 and 400 in number. They are hardy enough to remain out on the island all year round and are relatively easy to lamb. The mixed grazing regime allows the island to sustain a healthy dung beetle population, the grubs and adults constituting a significant part of chough diet.

In the 20 years that RSPB Cymru has owned Ramsey, four very privileged wardens have had the honour of living and working in this most beautiful yet harsh environment. The current wardens are resident all year round, looking after the farm, survey work, volunteers and visitors. Around 4,000 day visitors land on the island each year, although sailings are always subject to sea and weather conditions. Ramsey has become one of the most popular residential volunteering sites within the RSPB, with over 60 individuals giving up at least a week of their time to help each year and with just two full-time staff we couldn't run the reserve without their help.

Life on the island is unpredictable, challenging and physically demanding, but it is always exhilarating and surprising. Ramsey has something to offer whatever the season, whether it is seabirds in

Passenger boat leaving with school group

spring, the purple glow of the maritime heath in late summer or hundreds of white-coated seal pups in autumn. Some people come to see a rare lichen, beetle, bird or plant; others just come to feel the unique and empowering sense of isolation that Ramsey can offer.

***Lisa Morgan** is one of two full time wardens based on RSPB Ramsey Island, where she has been living*

M. Hoffman

Chough *Pyrrhocorax pyrrhocorax*

Lisa Morgan

and working for the last seven years. Before that she was Assistant Warden and Field Assistant on both Skomer and Skoholm Islands, working for the wildlife Trust South and West Wales.

Visiting Information:
Ramsey is open daily between 1 April and 31 October. Boats leave the lifeboat station at St Justinians at 10am and 12 noon, returning from the island at 4pm. Bookings can be made in advance through Thousand Islands Expeditions on 01437 721721 or email sales@thousandislands.co.uk Landing is free for RSPB members, £4 for adult non-members and £2 children. Boat fee is payable in addition.

Ynys Dewi

Fel sawl ynys arall, mae poblogaeth adar Ynys Dewi wedi dioddef oherwydd mewnlifiad llygod ffyrnig, a gyrhaeddodd y lan trwy nofio o gychod fwy na thebyg. Yn 1999-2000 cafodd y llygod eu difa'n llwyddiannus. Cynyddodd tinwennod y garn i fwy na 100 pâr, un o boblogaethau dwysaf Cymru, ac erbyn 2012 roedd adar drycin Manaw wedi cynyddu 400% er 1999. Cafodd pedrynnod drycin sy'n bridio eu cofnodi am y tro cynaf yn 2008, er nad yw'r pâl wedi dychwelyd hyd yma. Mae'r ynys hefyd yn bwysig ar gyfer y frân goesgoch.

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Life in the Seas *(weekly course)*	24-10-12
Centre for Alternative Technology, Machynlleth	
Identifying Mosses, Liverworts, Lichens	28-09-12
Pond & Stream Invertebrate Life	12-10-12
Courses at the Stackpole National Trust Centre	
Wildlife Digital Photography	28-09-12
Courses at Denmark Farm, Lampeter	
Pond & Stream Invertebrate Life	28-09-12
Identifying Mosses, Liverworts, Lichens	20-10-12
Introduction to Permaculture	03-11-12
Ecology 1	17-11-12
Courses at Countrysole, Almeley, Herefordshire	
Introduction to Permaculture	26-10-12
Courses at Trigonos, Caernarfon	
Introduction to Permaculture	26-10-12

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Falling apples

Painting a picture of Welsh orchards

Alice Rees

Mistletoe in John Kennedy's orchard

The bad news is - there's not many of them left. The good news, though, is that most orchards clinging on in Gwent are still managed with traditional methods and are hosts to a multitude of different species, not least the parasitic mistletoe. ***ANDREW MICAH GREEN*** *makes a plea for more orchards.*

There was a time, long ago every spring, when the green hills above the Monnow River flowered into pink and white.

John Kennedy remembers it. He's 73 now, and when it comes to reminiscing about orchards, his mind is as sharp as a tack. “In May time,” he says, “when the blossoms were out, there was a lovely perfume around the countryside.”

Not anymore. All that's left of that landscape blanketed by orchard after orchard are tiny islands, fragments of a once proud heritage. John's home in Rockfield, just outside Monmouth, has a couple of these fragments – five acres here, another seven acres there – remnants that have been in John's family for generations. These orchards are the birthplace of the Breakwell's Seedling, a once-popular bittersharp cider apple, first found near a pigsty and named after John's grandfather, George Breakwell.

Paul Brock

Noble chafer

"They fed apples to the pigs," John says, "and pips went out in the manure. They put the manure out in a heap and it started a tree growing. No one could decide which apple it was, so it was named after my grandfather."

Today, although Breakwell's Seedling is highly recommended among cider producers, it's yet another Welsh cider apple whose numbers have been decimated over the decades. Varieties like Perthyre, Twyn y Sheriff and Gwell na Mil, and perry pears like Berllanderi Green and Welsh Gin are nearly all gone.

Alice Rees, Gwent Orchards Project Officer at Gwent Wildlife Trust, believes we have lost traditional orchards because they weren't seen to be economically viable, with farmers no longer finding a market for their locally produced fruit. One reason for this is that traditional orchards can't give the incredibly high and predictable yield, year after year, which various big name cider producers need. Ironically, many orchards were originally planted to supply fruit to these producers, but over the years contracts have expired and not been renewed. Some of these amazing orchards still remain, but no one is replanting them so they'll be lost from the landscape in the next 50 years.

Most, however, are long gone. Once Monmouthshire alone had around 4000 acres of orchard, and cider and perry production kept apace with its Herefordshire and Worcestershire neighbours. But in the last century nearly 90% of Monmouthshire orchards have disappeared.

The Gwent Orchards Project

The Gwent Orchards Project was a two year effort finishing in autumn 2012, devoted to conserving and protecting local orchards and highlighting their importance to Welsh heritage and Welsh wildlife. Alice and a team of volunteers have surveyed hundreds of acres of Gwent countryside, analysing what's left, what condition it's in, and how the traditional orchards are habitat to a rich diversity of wildlife and plant life.

They found some interesting statistics. Monmouthshire is by the far the most orchard-rich county in the region but Newport has a significant number as well. A really promising outcome of the survey was that over 90% of the remaining orchards were traditionally managed and only 5% showed evidence of herbicide use.

This means that although we have lost many of our orchards, those that remain are of very high wildlife value and are as vital to the region's ecosystem as fens and forest. The blossom provides an early nectar source for wild bees coming out of hibernation, whilst the fruit is food for birds and mammals fattening up before winter. The trees themselves are home to bats and birds. Even the deadwood has a purpose, creating a nesting spot for insects and a hunting ground for other insects that feed on them. One, the noble chafer beetle (*Gnorimus nobilis*), is almost completely dependent on traditional orchards, living within the shadows and hollows of the deadwood. This beetle, now extremely rare in the UK, is thought to be declining because we are losing our traditional orchards.

Chris Jones

Mistletoe, once considered a pest, also has its place. Although it is indeed a parasite, attaching itself to an orchard tree and feeding from it, in turn mistletoe becomes food for an enormous collection of creatures like the mistletoe marble moth (*Celypha woodiana*) – now a threatened species because mistletoe has declined along with the orchards. Five other insect species rely on mistletoe for survival, including one beetle which specialises in eating those other insects which feed on mistletoe!

Mistletoe is a wonderful plant and something we should encourage in our orchards, though it is crucial to manage it as regularly as the fruit trees themselves. It should be pruned every year to leave only a few bushes in a tree. Severe infestations can threaten the life of the orchard, and when the orchards disappear entire habitats are lost along with the animals and plants that rely on them.

The Project worked to reach landowners and help them to look after their orchards, offering free training events to teach how to prune and graft fruit trees, and also to learn how to identify fruit and manage mistletoe. They were encouraged to manage orchards traditionally, in other words with low intensity techniques, without chemicals and pesticides, and pruning with an eye on maintaining a habitat rich in wildlife. Fruit trees are relatively short lived (an apple may only reach 100 years), which means that in an ancient orchard several trees are likely to need replacing, maybe even as many as one or two a year. This must be done to ensure the continuity of orchards in the landscape.

Core of the problem

The future of orchards in Wales could lie with the planting of community and school orchards. People have become more aware of the environmental impacts of intensive food production and imports, and they have become more interested in growing it for themselves. An increasing number of communities are coming together in projects of this kind.

But is it enough to encourage better management and promotion of community orchards? People need to understand that their landscape – the farms and orchards where our food is grown, the hills and valleys

Alice Rees

Learning at Apple ID Day

and marshes and forests where the wildlife live, and the towns that we call home – are all interconnected. We need to make the links to understand that what happens in one area affects another. It's not only wildlife which relies on orchards. We do too.

John Kennedy believes we need to make sure local, smaller fruit growers can compete with the giant producers fairly, especially the ones who source outside Britain. Once people stop caring, these traditional orchards don't stand a chance. "I carried on the family tradition. But times change, and unless something is done, it's a legacy that will be lost."

So plant an orchard if you can. Use the most vigorous rootstocks so the trees are durable and able to withstand our often difficult climate. These trees develop the most abundant veteran features (those developing with age, such as holes in the trunk and crevices in the bark) which are extremely valuable to all sorts of wildlife, and they will produce more fruit in the long run and require the least maintenance. Trees in pots will do if you are really short on space, or try cordons or espaliers. Work with your local community to plant a heritage orchard in your neighbourhood – it's easier than you think. Or donate some fruit trees to your local school so that the children can benefit from having a school orchard. What better place for them to learn about where their food comes from and how wildlife can coexist with this important function?

Orchards are places for wildlife, heritage and food production. They are a Welsh tradition and one which we really cannot afford to lose.

__Andrew Micah Green__ is Volunteer Newsletter Editor with Gwent Wildlife Trust.

The Gwent Orchards Project is funded by the Heritage Lottery Fund, Countryside Council for Wales and Wye Valley AONB Sustainable Development Fund.

Prosiect Perllannau Gwent

Yn ystod y ddwy flynedd ddiwethaf mae cannoedd o erwau o gefn gwlad Gwent wedi cael eu harolygu er mwyn cofnodi presenoldeb a chyflwr perllannau traddodiadol a oedd ar un adeg yn gorchuddio'r rhan fwyaf o'r sir. Wedi eu plannu'n wreiddiol er mwyn cyflenwi'r rhai a oedd yn gwneud seidr a pherai, mae'r perllannau bellach wedi darfod oherwydd nad oeddent yn ymarferol yn economaidd. Mae perllannau'n ecosystemau gwerthfawr, yn cynnal gwahanol fathau o adar, cennau, a phryfed, yn ogystal â bod yn 'llety' i uchelwydd parasitig. Mae Prosiect Perllannau Gwent wedi cefnogi perchnogion perllannau trwy eu hyfforddi a'u cynghori sut i reoli perllannau mewn ffyrdd traddodiadol.

Marine Collections Supporting Research in Wales

Amgueddfa Cymru—National Museum Wales' (NMW) marine collections date back to the early 1900s, although some donated specimens date well before then. While most marine phyla are represented in the collections, we specialise in the study of marine bivalve shells, polychaete worms and seaweeds.

Our collections are not static but constantly grow through both fieldwork and donations. Donations vary from individual specimens cited in newly published papers to reference collections created through survey work. Specimens are also received from scientists worldwide for safekeeping in our collections.

The Marine Biodiversity Section's collections currently contain around 55,000 records comprising over 650,000 specimens, of which two-thirds are from around the coast of Wales. The predominantly British collection of marine algae, mounted on over 4,000 herbarium sheets, includes 422 species of seaweed, nearly two-thirds of the UK list. The mollusc holdings, including the historically important worldwide Melville-Tomlin collection, house over 120,000 lots of marine shells, as well as molluscs from terrestrial and freshwater habitats.

The Significance of Museum Collections

Museum collections are significant as main depositories for 'type' specimens; those that represent the original reference point for any particular species. However, the thousands of other specimens that represent decades of marine fieldwork and survey work are a vital resource as well — particularly in an age of environmental change.

Loan requests for specimens are regularly received. Being public institutions, museum collections can be accessed by all scientists, both domestic and international, amateur and professional, through specimen loans or by direct visits. Access to specimens not deposited in museums can be very difficult. Universities rarely maintain such collections nowadays, and consultancies often only keep specimens for a short time.

After a survey report is published specimens may not be seen as important, however they still have great value to future research. It is not unusual to find several species misidentified under a single name and these then need to be individually described. Ideally, previous records of such species need to be re-investigated and the correct names applied. Unfortunately, unless the specimens have been deposited in a museum, it can be almost impossible to track them down or gain access to them for verification.

Over the years, the marine collections at NMW have grown substantially not just through our own work but also through the acquisition or donation of reference collections. Large donations have included the reference collection of the Oil Pollution Research Unit, established in Pembrokeshire in

Oldest molluscan holotype in the collection, collected by Captain James Cook during his final voyage

1967. This invaluable collection of specimens from all around the UK and abroad was collected during years of oil and gas baseline surveys and monitoring. It was transferred to Cardiff when the branch closed down in 1999. Reference specimens from the ongoing marine monitoring work of the Countryside Council for Wales (CCW) around the Welsh coast are regularly deposited in our collections. In 2010, CCW also donated over 1100 seaweed specimens, comprising the combined collections of Drs Margaret T. Martin (a founder of the British Phycological Society) and William Eifion Jones (former lecturer at Bangor University).

The museum collections are well-used for research, both in-house and by scientists based in the UK and other countries, resulting in citations in many published works. The high reputation of these collections across the scientific community is ensured through their continued growth and use.

Teresa Darbyshire
Marine Researcher in the Dept. Biodiversity Marine Section at the National Museum Wales.

Bardsey: diary of a visit in July

Saturday – after a sunny crossing, we find banks of lovely Ladies Bedstraw and Wild Thyme along the lane as we walk up to Cristin, the home of the Bird and Field Observatory. The island is very soggy, water everywhere. We inspect a bug hotel outside Cristin, and also compost loos for day visitors. These have been installed by the Bardsey Island Trust at Plas Bach, just up the lane from Cristin.

Sunday – we find six fields of spring-sown oats. These will be mown and rolled into big bales, covered in plastic – fodder for cattle during the winter. Some of the crop will be left standing to feed Linnets and other seed-eaters. The stubble is important for birds in some winters, such as 2010/11 when the fields held large numbers of Skylarks and other species fleeing the snow-covered mainland.

Monday – talk to Steve Porter, living in Ty Pellaf with his family. Last year he was very short of grass, this year he has too much. Maybe Gareth will ship over more sheep from the mainland. The Welsh Blacks would normally be on the marshy fields close to the withy beds, but these are too soggy to be grazed. So the cattle are on the fields along the W coast and on the maritime heath; the latter is a special feature of the island and needs occasional grazing. The hay fields are also very damp, too wet for haylage to be cut and baled.

Tuesday – Christine Evans (poet and mother of Colin, our boatman) gives a talk in the schoolroom. She tells us about the people who have lived on the island from the Stone Age to the present day. We've heard her talks before, and always enjoy them; she has obviously unearthed some new material in the last few years.

Wednesday – we climb the mountain (548 ft) and visit the rest of the island. There are small numbers of Puffins flying past the NW corner and the S end, also on the sea on the E side. They were first proved to breed in 2002. In the evening we watch a young Peregrine (two pairs nesting now) learn to chase birds – here a group of Choughs above Cristin. They don't take it seriously, as if they realize it is not yet a threat. Peregrines do catch Choughs though. Next it visits the West coast and upsets the Oystercatchers breeding there.

Thursday – another lovely sunny morning. A Great Spotted Woodpecker has turned up, quite a rare visitor. It is a young bird sporting a red cap, and we watch it feeding on top of a clawdd wall, digging out ants. This is what the Choughs do, also Wrynecks when they turn up on migration in September.

Friday – chatting with island residents, and we buy two bags of lettuce from Jo Porter to take home. First few leaves conceal two snails so the remainder are carefully washed and air dried. Then down to the very wet fields by the withy beds. These fields are a joy to behold, full of Spotted Orchids, Ragged Robin and Bog Pimpernel. Let's hope the cattle will be allowed on here eventually.

Geoff Gibbs
Bog pimpernel

Geoff Gibbs
Bug house

Saturday – an early crossing back to Porth Meudwy. Two passengers returning from Carreg Bach (one of the smaller Trust houses available for rent) have not seen Puffins, so Colin takes the boat close in along the East side. Good views of Puffins outside burrows, and point-blank views of immature birds (with smaller bills) flying past the boat. Finally, plenty of time to visit Aberdaron; sad to hear that the small bakery with a corrugated iron roof is closing next month. The baker's knees have had enough.

Geoff Gibbs

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Mae 'Cyfrinachau Llynnoedd Eryri' gan Geraint Thomas yn datgelu gwybodaeth eang am nodweddion, cymeriad a chyfoeth hanesyddol gwahanol leoliadau yn nyffrynnoedd Eryri.. Mae'r llyfr hefyd yn cyfeirio at rai ardaloedd o dir uwch. Adlewyrchir y cwmpas daearyddol hwn mewn 'taith' o'r Carneddau yng ngogledd Parc Cenedlaethol Eryri, tua'r de at Llyn Barfog, yn agos at Aberdyfi.

Ceir yma gofnodion o'r defnydd hanesyddol a wnaed o'r tir yng nghyffiniau'r gwahanol lynnoedd, sydd yn ei dro wedi cael dylanwad ar y dirwedd naturiol o'u cwmpas. Hefyd mae yma nifer o gyfeiriadau difyr, a dychrynllyd, at chwedlau ac hanesion sy'n gysylltiedig â'r llynnoedd. Yn y llyfr hwn mae cyfoeth o wybodaeth sy'n annog rhywun i ymchwilio mwy. Er enghraifft, pam fod llyn yn bodoli gyda dau enw sef Llyn Nadroedd a Ffynnon Llyffant? Cyfeirir hefyd at ddatblygiadau diweddar a'r defnydd cyfredol a wneir o rai o'r llynnoedd.

Nodwedd mwyaf trawiadol y llyfr yw'r lluniau godidog, sy'n dangos y llynnoedd mewn goleuni diddorol, ac o onglau gwahanol i'r rhai a welir fel arfer ar gardiau post, ac mewn llyfrau eraill am Eryri. Mae gweld delweddau hollol newydd o lynnoedd cyfarwydd yn rhoi gwefr i mi – ond hefyd yn gwneud i mi holi fy hun pa mor gyfarwydd yr wyf fi ag Eryri, er i mi gerdded a gweithio yma ers dros 30 mlynedd! Mae llyfr Geraint Thomas yn wers ar arsylwi, gyda dyfeisgarwch ffotograffydd penigamp yn rhoi sglein arbennig ar y llyfr.

Sialens i'r darllenwr yw ymweld â Llynnoedd Eryri, yn lle'r pedwar copa ar ddeg sy'n uwch na 3000 troedfedd (sef 132 llyfr yn ôl Geraint!). Darllenwch y llyfr, edmygwch y lluniau, ac fe gewch eich ysbrydoli i ymweld â rhai o lecynnau mwya' trawiadol Eryri, heb ddilyn y tyrfaoedd i'r copaon ucha'. Gallaf eich sicrhau y bydd pob darllenwr, fel y gwnes i, yn dysgu rhywbeth newydd am Eryri drwy ddarllen y gyfrol hon.

Hywel Roberts

Heritage Trees Wales
Archie Miles
Graffeg 2012
260 pages £20

People come and go, but trees seem to be there forever. We plant trees in commemoration of somebody or something, expecting them to remain in the landscape long beyond our individual lives. How often have you wondered what tales a tree could tell?

Heritage Trees Wales attempts to tell us some of those tales. It is an amazing odyssey through the country, looking at trees that are steeped in history, myth, legend or other cultural significance, and a few that are just plain old. It's a book to dip in and out of, for there are too many stories and snippets to assimilate in one go.

Today the book fell open at the page entitled "Charley trees". What trees? The article led me through the history of the Scots Pine in Wales, Scottish foresters, the Jacobite rebellion, sign-posts for travellers and ley-lines. All that in a double-page spread that included two photos and a small map. And there are seventy-four such articles.

This book isn't about identifying trees, cultivation of trees, or anything remotely technical. It is about people, places, time and landscapes: the elements of heritage. These are trees for curious minds.

Do I have any gripes about the book? Only that that Pembrokeshire gets a measly two trees (plus a reference to the drowned forest at Amroth), and Anglesey doesn't get a mention at all. It is heavily weighted towards the borders and the south-east, but perhaps there really are more heritage trees there.

You can see a sample of this 260 page hardback on the publisher's website at **https://www.graffeg.com/products/heritage-trees-wales**. But you'll need to buy the book to find out about the Curley Oak or the Weird Birches of Ty Uchaf, and which masculine "Old Lady" had stood through the reign of seventeen Kings and three Queens by 1813.

Annie Haycock

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One of the most important functions of NATUR is to represent our members' views. We must ensure that the voice of conservation and countryside professionals is heard. Recently, we have prepared a response to the first consultation on the proposed highly protected Marine Conservation Zones.

Anyone responding to a government consultation will inevitably question the validity of the process. Is government asking relevant and informed questions? Will they take account of our comments? Most importantly, a consultation should bring people together to debate the relevant issues and identify policies that can be supported by the majority of interested people. It should provide a proper forum for gathering opinion that will eventually lead to the successful implementation of the legislation.

Unfortunately, this phase of the consultation has failed to develop a proper, constructive debate. Instead, it has polarised opinion, widened minor divisions and created unnecessary confusion and anxiety. We believe that both the consultation document and the engagement process were at fault. The document was misleading and, because it was so ambiguous, difficult to understand. This has created and fuelled high levels of misinformation, distrust and opposition, leading to many organisations and individuals distancing themselves from the process. Given that there has been so much confusion, we are very concerned that some responses will be based on an inadequate or distorted understanding of the proposals. We hope that Government will recognise this fact and ensure that their decisions are based on valid and informed contributions.

Although NATUR broadly supports our Government's Marine policy, we are concerned that the proposals fall far short of the actual requirement. It is essential that Government recognises that marine conservation is no less important than terrestrial conservation: levels of protection at sea must be at least equal to those provided on land. There is a wealth of reliable evidence from around the world to demonstrate that highly protected marine sites deliver both ecological and socio-economic benefits. We agree with a site selection process based on sound ecological evidence, but we are not certain that socio-economic evidence has been subject to the same high standards of scrutiny.

We believe that the highly successful Skomer Marine Nature Reserve should have been recognised as an outstanding example of everything that high levels of protection can deliver. However, there is nothing to suggest that the experience gained at Skomer has influenced the decision making process. We are also very concerned, given the impending changes, that we have had no reassurances that Skomer will continue to be managed to the current high standards.

As protection increases there will inevitably be some negative socio-economic effects, the most significant of which are likely to be the displacement, but not necessarily reduction, of commercial fisheries. This, though, must be balanced against the expected significant enhancement of populations of crustaceans and molluscs. There is no reason to believe that the zones will threaten the tourist industry, and, even if there are limited negative impacts, the industry will undoubtedly benefit overall.

We hope that Government will learn the lessons from this difficult phase of the consultation and continue to develop their stated marine policies. If we are to progress from here, a genuine and proactive consultation process must be based on carefully considered and unambiguous information. For many people who love and support our marine environment, or are dependent on it for their livelihood, the prospect of change almost inevitably feels like a threat. If this consultation is to succeed, it has to show that protecting our seas will bring benefits to most of those people who care so much about them.

Mike Alexander

NATUR is the professional institute for all those who manage, conserve and promote the living and cultural environment of land and sea in Wales and provides:

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Contact **Mo Morgan**, 07837 419995 / mo@natur.org.uk or www.natur.org.uk

Groundwater animals - the stygobites of Wales

Groundwater animals are small invertebrates found in subterranean waters, possibly one of the oldest habitats in Wales. Aquatic invertebrates are well studied in surface water systems such as rivers, lakes and ponds, where they are numerous and diverse, often reacting rapidly to environmental changes. This allows for routine monitoring to classify the biological health of surface water systems, using many invertebrates as indicator species.

However, aquatic invertebrates are not just limited to surface water bodies. Groundwater is a vital resource supplying drinking water to springs, wells and boreholes, and supporting many rivers and wetland systems, but it should also be considered as a habitat in its own right. The hyporheic zone beneath river beds, aquatic habitats in caves, and many aquifers provide a suitable habitat for some of our most elusive and understudied animals.

The most specialised of these are various crustaceans collectively referred to as stygobites. They inhabit a subterranean ecosystem where light is absent and food scarce, often showing adaptations to the environment such as lack of eyes and pigment. It is these crustaceans on which we hope to shed more light.

Groundwater as an ecosystem

Conditions for life are quite different in a subterranean world, actually offering quite a stable environment. Temperature and water quality are much more consistent than surface water, although levels of dissolved oxygen can vary with depth. Food may be scarce, and consists of organic material washed down into the aquifer from the surface via fractures and fissures, or biofilms of bacteria and fungi.

Not all aquifers provide suitable habitats for stygobites. Compact rock types with limited pathways can limit the distribution of groundwater animals, as can faults and other geological boundaries. The groundwater must also have some oxygen and shouldn't be heavily contaminated, though recent surveys in England suggest that stygobites can tolerate wide-ranging water quality: it is habitat suitability rather than water chemistry that primarily controls their distribution.

Species

Wales has six species of stygobite recorded to date, from 1-15mm in size. The first was in 1939 at Dan yr Ogof Cave. Both *Microniphargus leruthi* and *Antrobathynella* have been discovered in Wales since 2011.

- Amphipods (colloquially referred to as 'well' or 'cave shrimps'): *Niphargus fontanus*, *Niphargus aquilex*, *Microniphargus leruthi*, *Crangongx subterraneus*
- Syncarida: *Antrobathynella stammeri*
- Isopoda: *Proasellus cavaticus*

Recording has mostly been undertaken on an ad-hoc basis by people with a keen interest in these animals. Not surprisingly, many of the records are located within limestone areas of known cave development. Not only is this an ideal habitat for stygobites, it also provides access for humans, often keen cavers, to collect and record. This can be done by kick sampling in streams and netting, or manual searching of pools and larger underground lakes. Elsewhere, specially designed nets are lowered into deep boreholes and wells to obtain specimens, and drift nets are left at spring mouths to catch animals washed out of aquifers during high flows.

With only 200 stygobite records in Wales, it is probable that the current distribution patterns (see map, back page) represent recording effort more than actual ranges of the species. Wales (and the UK) is quite poor with respect to stygobite diversity. This has been attributed to the Devensian glaciation that covered most of Wales with a thick ice sheet, with permafrost present to the south. However, recent research suggests that some species may have survived the glaciation in groundwater refugia deep below the surface.

Wales has a dedicated national recorder and a core group of academics and enthusiasts advancing the survey and study of these animals. The groundwater below our feet is a very special habitat worthy of further study: we hope this habitat is recognised in future strategy and policy for Wales.

***Gareth Farr** is a hydrogeologist at Environment Agency Wales.*

New Ancient Woodland Inventory is launched

The Ancient Woodland Inventory (AWI), which identifies woodlands that are believed to have been in existence since 1600 AD, has been updated using new technology. As a result it identifies an additional 33,000 hectares of ancient woodland in Wales, bringing the total to 95,000 ha – more than 30% of all Welsh woodlands.

Ancient woodlands are recognised as being more ecologically diverse and having higher nature conservation value than those that have developed recently or where woodland cover on the site has been intermittent. Their value lies in their special history, and because of that they cannot be 'created' except over an equivalent 400 years or more of development. It is particularly important that these 'living monuments' should be protected.

The first AWI was published during the 1980s, using hand-drawn tracings from old documents and early Ordnance Survey one-inch maps. In 2004 the existing woodland inventory was transferred onto digital maps and an attempt made to update the many boundary discrepancies that existed in the paper maps. Then in 2009 two pilots were commissioned to check that the woodlands identified on the maps could be verified when checked on the ground. This validation resulted in a full revision of the inventory, completed in 2011.

The existing *AWI 2004 and National Forest Inventory* (which assesses the size, distribution, composition and condition of woodlands) was compared with Epoch 1: 1st County Series Ordnance Survey maps. The Epoch 1 maps provide a more reliable and comprehensive baseline than the paper maps used for the AWI 2004. They are easier to use, more accurately surveyed, and the enhanced symbols and larger (1:2,500) scale allow for easier and more conclusive interpretation.

This, together with improved accuracy of the digital mapping, and technology allowing areas of woodland 0.5-2.0 ha in size to be included for the first time, has meant the revised inventory includes many more woodlands than were identified previously.

However, as with the previous inventory, this evidence may sometimes be incomplete or misleading. Some areas may have been excluded where 1:2,500 scale Epoch I maps were not available and others may have been included as ancient when they are not. For example, an early 19th century plantation created on agricultural land after 1600 could be misidentified on the map as ancient woodland. Conversely, an area cleared of woodland since the Epoch 1 maps were produced may have since become re-wooded.

In recognition of factors such as these, the inventory remains 'provisional'. Landowners are allowed to challenge the inclusion of woodland in the inventory, or to supply additional evidence about the status of their woodland. This appeals process will be managed by Forestry Commission Wales.

The revised AWI places woodlands into one of four categories:
Ancient Semi-Natural Woodland (ASNW) – broadleaf woodlands comprising mainly native tree and shrubs which are believed to have been in existence for over 400 years.
Plantation on Ancient Woodland Site (PAWS) – sites which are believed to have been continuously wooded for over 400 years and currently have a canopy cover of more than 50% non-native conifer tree species.
Restored Ancient Woodland Site (RAWS) – woodlands which are predominately broadleaved now and are believed to have been continually wooded for over 400 years. They will have gone through a phase when canopy cover was more than 50% non-native conifer tree species, and now have a canopy cover of more than 50% broadleaf. The term 'restored ancient woodland' does not mean that the woodland is fully restored or that it is in good ecological condition. Active restoration work may well be necessary.
Ancient Woodland Site of unknown category (AWSU) – woodlands which may be ASNW, RAWS or PAWS. These areas are predominantly in transition, where the existing tree cover is described as shrubs, young trees, felled or ground prepared for planting.

***Chris Tucker**, Forestry Commission Wales Biodiversity Policy Officer*
Chris.tucker@forestry.gsi.gov.uk
For more information and maps visit www.forestry.gov.uk

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